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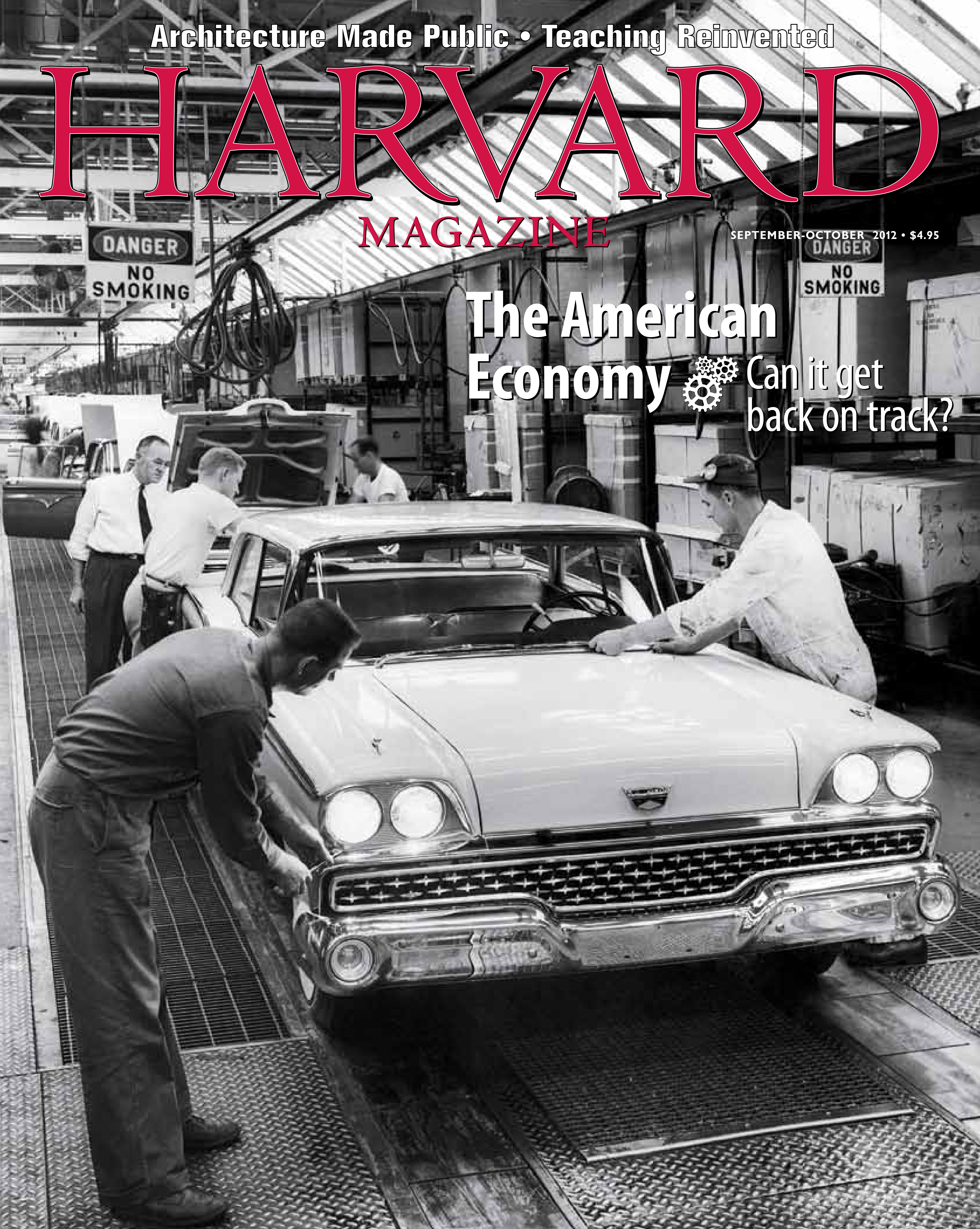

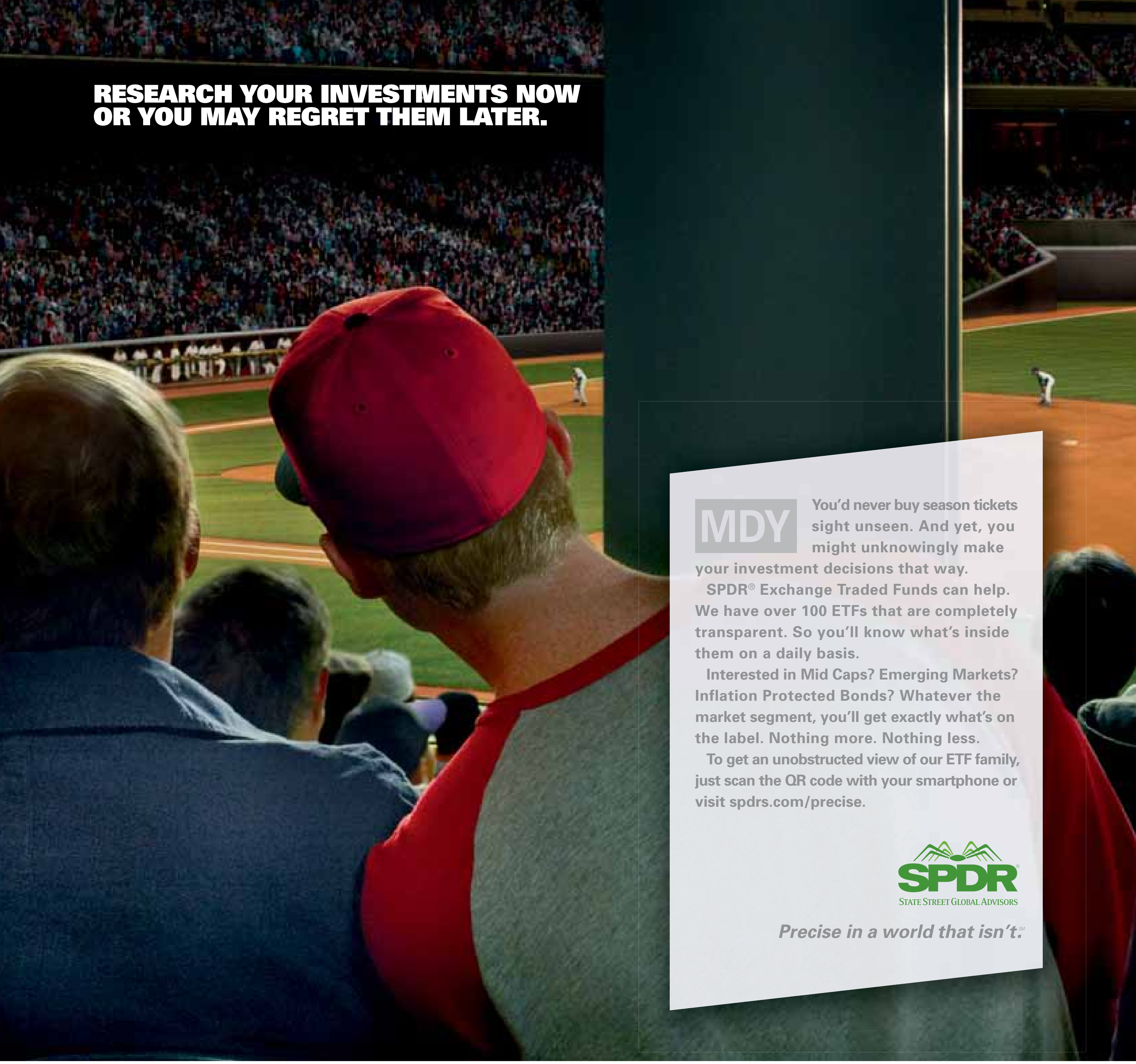
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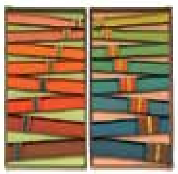
FEATURES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DEPARTMENTS

On the cover: Assembling 1959 Fords. Photograph by Philip Gendreau/ © Bettmann/Corbis


JON KRAUSE

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Cambridge 02138

Constitutional revision, voter fraud, hyrax vs. hedgehog

COMPROMISE CONFOUNDED

Amy Gutmann and Dennis Thompson write that legislative bargains are not negotiated with an ultimate threat of force in the background ("The Case for Compromise," July-August, page 24), but of course it was not always so. The Civil War teaches us that not only is governing a democracy without compromise impossible, but democracy itself cannot exist without it.

Lincoln, in the Gettysburg Address, asserted that loss of the war would mean that government of the people, by the people, and for the people, would perish from the earth. One might wonder why he thought the stakes were that high. If the South had won, there would have been an independent Confederate States of America that allowed slavery, but the North would have continued as the United States of America, with the same democratic government, institutions, values, and people as before.

But Lincoln's understanding was that if major, unbridgeable disagreements could be resolved through secession, even without war, the incentive for compromise would be vitiated, the potential for further splintering was limitless, and democracy itself could not survive. Our challenge today is to prevent the red and the blue from becoming the blue and the gray.

Andrew Satlin, M.D. '79
Short Hills, N.J.

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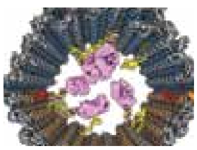

DNA Nanorobots
page 12 | Watch a video of researchers discussing a cell-targeted, payload-delivering DNA nanorobot that aims to kill human cancer cells.

Patterns of Place
page 46 | Watch a video of renowned architect William Rawn discussing "patterns of place" and how they apply to his design for the Cambridge Public Library.

***Sound,* Remixed**
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Social Museum
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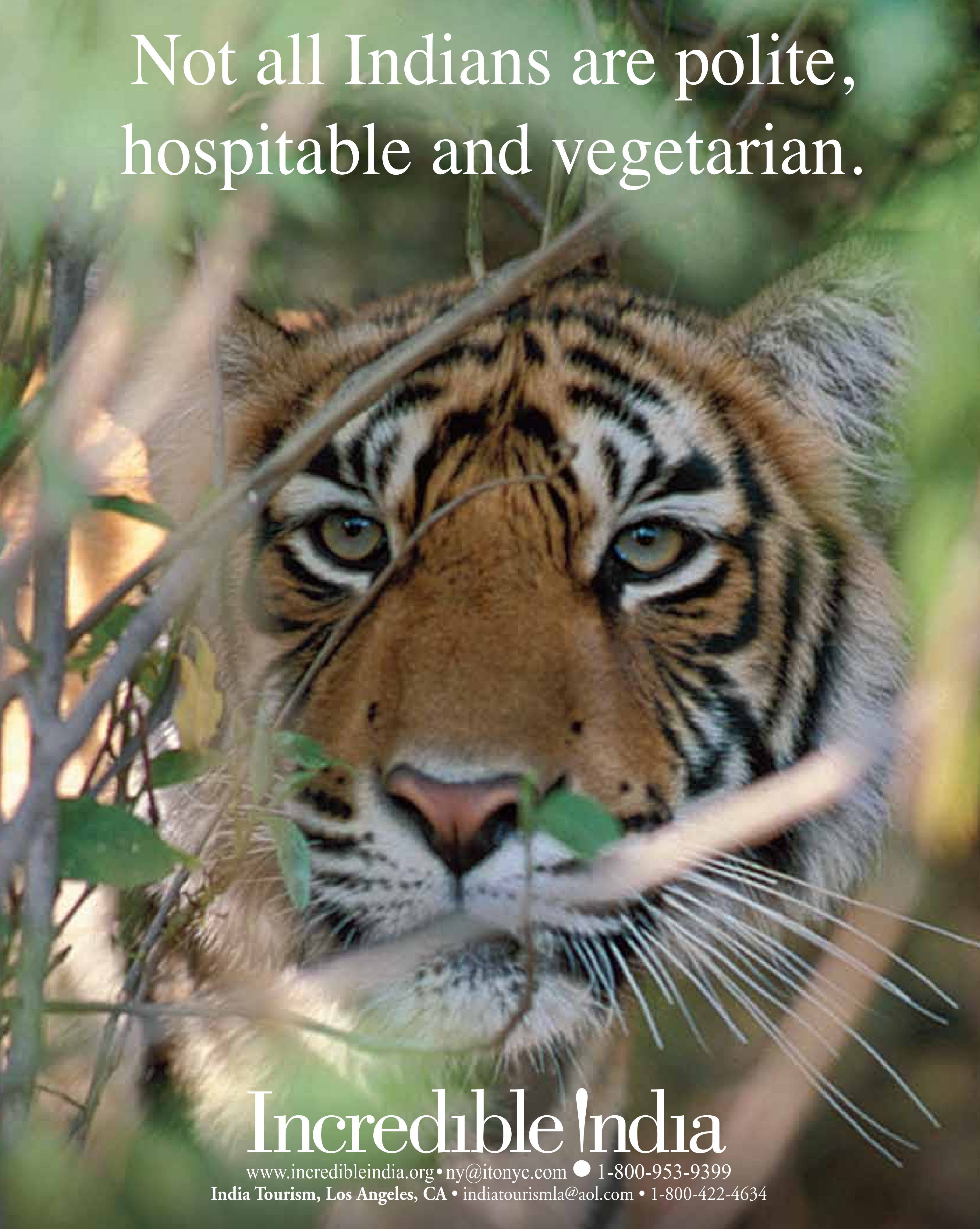
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Gutmann and Thompson talk about continuous campaigning and gridlocked governing due to an unwillingness to compromise. I think one reason for this is that the primary system of choosing candidates has been in use too long. Politicians have found that appealing to extremists among the voters is a good way to win nomination. Then when they win the election, they have to cater to the extremes. If they compromise, the extremists won't vote for them next time. The primary system was an improvement over the "smoke-filled room" nominating process. Some of the present problems began when politicians figured out how to (mis)use the system to their advantage. This can be prevented (or minimized) if we change the nominating process as soon as the politicians figure out how to misuse it: maybe every five years or so. Can anyone think of a new nominating process?

Ted Grinthal
Berkeley Heights, N.J.

CONSTITUTIONAL CONUNDRUMS

The "narrow but profound flaw at the core of our Constitution…that has allowed our government to become captured by moneyed special interests" requires an even more radical constitutional change than Lawrence Lessig has proposed ("A Radical Fix for the Republic," July-August, page 21). Representatives, senators, and first-term presidents would not spend time raising money if they could serve only one term in each office. If we made each of those terms nine years, with elections held every three years (i.e., elect representatives, three years later elect senators, three years after that elect a president, then back to representatives), we would always have experienced people in office and we would still retain accountability to voters.

Yes, some representatives would spend too much time running for the Senate, and a few senators would have presidential ambitions…but the magnitude of the problem would be greatly reduced.

John Hartung, Ph.D. '81
Brooklyn

The main reason running for public office is so costly is the price of TV time. Candidates need to raise huge sums for this purpose and thus are beholden to the donors. But TV channels are not owned by the networks. They are owned by us, the people, and licensed to those who pay for them. The Federal Communications Commission lists "public service" as one of the conditions for license. The FCC, or Congress, should require TV channels to *give* an equal amount of time to all candidates for each office. If any candidate *buys* more time, the selling channel must be required to give an equal amount of time to all other candidates for that office. That will even the playing field. An alternative, as done in the United Kingdom, is to ban the use of TV in political campaigns altogether. Either process would remove the need for candidates to sell their souls to special interests, and allow them to represent the voters.

Abigail Beutler, Radcliffe '50
Nashua, N.H.

Lessig's idea of calling a constitutional convention to remedy the ills caused by our current campaign-financing laws (and perhaps the new definition of corporate personhood) is intriguing, but its efficacy depends on whom the several state legislatures choose to represent themselves at such an assembly. I could easily envisage the Convention instead becoming fertile ground for new amendments to our Constitution long sought by single-issue interest groups: defining life as beginning at conception, prohibiting the desecration of the flag, requiring a balanced budget, and permitting prayer in school, for some. I, for one, would be reluctant to roll the dice.

Wayne Forester '80
Atlanta

Lessig's constitutional overhaul proposal needs more concrete ideas from somebody. There's surely too much money sloshing around Congress—more than $25 million per legislator per year, by one reckoning—and far too much time is spent chasing campaign dollars, and far too little on researching and debating proposed legislation.

But eliminating the *Citizens United* error won't help much: that would just improve

Associate editor Elizabeth Gudrais '01, a former Ledecky Undergraduate Fellow who joined the staff in 2007, has left for the Midwest and marriage. She departs with our warmest thanks for her distinguished reporting and leadership in expanding the magazine's online presence. Her final feature as a staff member, based on previous reporting in India, will appear in the November-December issue. *—The Editors*

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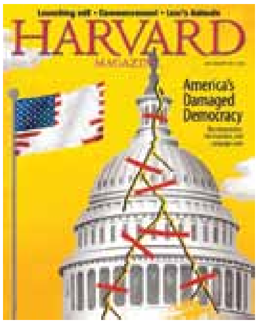
HM The three July-August articles on American governance attracted lively comments and critiques. A representative sample appears here; the conversation continues online at http://harvardmag.com/letters-12.



the campaigning problem. Once elected, our legislators have shown themselves to be good at passing and using procedural rules to block any bills they don't like. There are 1,500 pages of these "protect the minority" rules—the "nobody's-there-filibuster" process is just one of them, all too often used to cut off debate.

Before we consider starting the colossal effort needed for a constitutional convention, we need a well-thought list of changes in how the Congress does its work; a list of simple, specific, even-handed, immediately effective changes. Reversion to democracy (i.e., 50.0001 percent wins) by eliminating the supermajority rule is one. Fixed, short, term limits is another. The system is surely broken and the sooner we get out the hammer and fix it the better.

T. H. Stearns '53
Nashua, N.H.

Lessig addresses the serious problem of money buying improper political influence. This has been true for citizens of every nation in the world at any time in history. This will never be eliminated, but like every other injustice we must constantly work to minimize it. A constitutional convention will not solve the problem now any more than it did in 1789. Nor should we risk losing those constitutional rights that we have to the unpredictable results of a new convention. I propose the following:

No candidate shall accept a contribution, payment, gift, or article of value except from a natural person residing within the district he or she seeks to represent.

Those seeking office should publicly adopt the above rule. Those who reject it should explain to the electorate why they are accepting outside money, and what influence it will have on them in performing their official duties.

This would not change the power of corporations and unions to spend unlimited amounts of money on independent communications. It would go a long way toward ensuring that elected officials are truly representing their own constituents.

Tom Hillery, A.L.M. '97
Henderson, Nev.

For what it is worth, I agree with Lessig's view of the current American political landscape. However, I don't think the American people have the courage to act any more than do their legislators.

Robert Kaplan '81
Ventor City, N.J.

The current system of campaign finance is a major threat to our system of government, and Lessig's proposed constitutional overhaul deserves serious and immediate attention. Let me suggest two areas for discussion:

First, to reverse the thrust of *Citizens United*, a donation to a candidate should be limited in amount and permitted only if the giver is a registered voter within the district in which the election is being contested. Moreover, total contributions should be eligible for match (also up to a limit) by public funds drawn from the proceeds of a national lottery.

Second, to ease the financial burdens on the candidates, let's shorten the campaigns. No primary or caucus to select presidential or congressional nominees should take place before June 1 of the election year, and no expenditures should be permitted except for campaign activities that take place within six weeks of the date of the election or caucus.

If these measures were broadly acceptable, the system might recover.

Leo Fishman '59
Charleston, S.C.

This morning I read the Lessig article and also finished Michael J. Sandel's book *What Money Can't Buy*. The Lessig article ends: "What it will take to fix things, [Lessig] says, is for Americans to recognize that 'the corrupting influence of money is the *first* problem facing this nation. That unless we solve this problem, we won't solve anything else.'" Sandel ends: "And so, in the end, the question of markets is really a question about how we want to live together. Do we want a society where everything is up for sale? Or are there certain moral and civic goods that markets do not honor and money cannot buy?" Both these Harvard professors are right, and they both echo Saint Paul's advice to Timothy: "For the love of money is the root of all evil..." (1 Timothy 6:10).

Nick Carrera '60
Frederick, Md.

WHO VOTES?

Alexander Keyssar is right to note the history of disenfranchisement in the United States, and I agree with his concern over the potential for denying any American access to the ballot box ("Forum: Voter Suppression Returns," July-August, page 28). His suggestions, however, that Republicans have fabricated reasons to enact voter identification laws and that their efforts to ensure voting integrity may have a racial component may be useful as political fodder but are factually unfounded. His assertion on behalf of critics "doubting both [such laws'] necessity and ability to keep elections honest" is muted by flagrant examples of voter fraud by both political parties throughout American history.

In 2008, the Supreme Court sided with the State of Indiana, declaring that the requirement to produce photo ID is not unconstitutional and that the state has a legitimate interest in deterring fraud. In the court's 6-3 majority opinion in *Crawford v. Marion County*, Justice Stevens stated that they failed to find "any concrete evidence of the burden imposed on voters who now lack photo identification" and that the "risk of voter fraud" was "real." In fact, the Indiana statute grants exceptions to this requirement and offers free photo ID in order to assist prospective voters. If, as Keyssar and others incorrectly suggest, voter fraud is exceedingly rare, so, too, are recent examples of legitimate voters being denied their right to vote.

My difficulty with his proposition is not just with his false assumptions about the impact of this "policy instrument" on inclusiveness, but also with his unconvincing attempt to conflate disenfranchisement with a right-wing conspiracy to discourage their opponents from voting. His thesis, while an interesting read, is as curious as Nancy Pelosi's charge that the contempt vote against Attorney General Holder is part of a carefully orchestrated scheme by those dastardly Republicans to thwart his challenge—as a civil-rights matter—to voter identification laws. No matter how insignificant Keyssar believes it to be, a requirement for photo identification, while not resolving the issue, will be a step in the right direction.

Christopher G. Hennen, M.L.A. '91
United States Military Academy
West Point, N.Y.

Perhaps because I grew up in, and live in, Illinois (where the saying "Vote early and often" originated), I have always thought that the threat of vote fraud is real. Of course, as

SPEAK UP, PLEASE

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I choose Harvard...

Edward Rasmuson ’62 and Cathryn Rasmuson

Edward Rasmuson ’62 was a self-described “oddity” when he arrived at Harvard College in 1958: He was a licensed pilot, had several years of banking experience, and was one of the only Alaskans who had ever attended. But Rasmuson’s father, Elmer Rasmuson ’30, MBA ’32, AM ’35, had urged him to enroll, and he’s glad he did. Today, the longtime banker chairs the Rasmuson Foundation, a leading philanthropic organization in the Northwest. In honor of his 50th Reunion, Rasmuson and his wife, Cathryn, have established a Cornerstone Scholarship to support undergraduates from Alaska. “Harvard gave me a lot of self-confidence,” says Rasmuson, who lived in Winthrop House and studied history and literature. “I hope this will encourage more people to apply from my state, knowing this scholarship can help them on their path.”

To read more, please visit *www.alumni.harvard.edu/stories/rasmuson*

PHOTOS: COURTESY OF THE RASMUSON AND UHRIG FAMILIES. MOUNT MCKINLEY, ISTOCK.

Jennifer Stonestreet Uhrig ’83 and Jonathan Uhrig

Growing up, Jennifer Stonestreet Uhrig ’83 dreamed about continuing the family tradition of attending Harvard College. And she did—becoming a third generation graduate after her grandfather, Lloyd Stonestreet ’23, and father, Craig Stonestreet ’51. Like them, she received support from undergraduate financial aid. Today, she and her husband are helping current and future students realize *their* Crimson dreams through the Jennifer and Jonathan Uhrig Scholarship Fund, established in 2008 to mark her 25th Reunion. “We feel lucky to be able to give back in this way. It was a natural fit,” says Uhrig, who lived in Kirkland House, concentrated in government, and is a former fund manager and now a senior equity advisor at Fidelity Management & Research Company in Boston. “It’s very rewarding to help a student go to Harvard.”

To read more, please visit *www.alumni.harvard.edu/stories/uhrig*

“It’s very rewarding to help a student go to Harvard.”

JENNIFER STONESTREET UHRIG ’83

Keyssar says, "the greatest threat to electoral integrity comes from absentee ballots." But fraud prevention is not the only legitimate purpose of a voter ID requirement.

First, the identification requirement should be seen as somewhat like the oath required before a witness can testify in court. It conveys to everyone the seriousness of the undertaking.

Second, it is not necessarily a good thing to make voting as easy as going to the bathroom. It is not an act of civic virtue to simply cast a vote. It is an act of civic virtue to cast an informed vote. I do not want a system where people can sit at home and vote on their computers, or where they can walk in and vote because they have nothing better to do at that moment, or because, as has happened (and still happens) in Illinois, someone paid them $20 to vote.

Keyssar says he would "welcome such laws if it were made clear that it was the responsibility of the state (rather than of private citizens) to insure that every eligible" person had the required documents. I agree the state should make identification freely and readily available to everyone so that poverty, disability, and the like do not stand in the way of eligible voters, but there is much to be said for making people show that they care enough about voting to make some effort, to the extent they are able, to obtain identification documents and to produce that identification when they vote.

William A. Schroeder, LL.M. '77
Professor of law, Southern Illinois University
Carbondale, Ill.

Harvard Magazine's balance of news about Cambridge developments and thought-provoking discussions about current events is a joy to read. One-sided partisan views of political topics, like "Voter Suppression Returns" by Alexander Keyssar, however, should stay out. Lesser publications can include them.

Christopher S. Edwards, J.D. '98
New York City

...AND DEMOCRACY, GENERALLY

Two articles in the July-August issue reminded me of the importance of incentives.

"When Having Babies Beats Marriage" (page 11), on Kathryn Edin's research into marriage and childbirth among lower-income Americans, mentioned the lack of economic incentives to delay child-bearing. What about incentives to marriage per se? Working-class, middle-class, and affluent couples face similar incentives: taxes are lower on joint income, credit is easier to obtain with pooled assets and joint income, one household is more economical than two, etc. What incentives or disincentives do lower-income Americans face? And how would those incentives be evaluated from a public-policy perspective? I would have liked to see this addressed.

Second, Lawrence Lessig, in joining the century-old quest to rid U.S. politics of special-interest money, has come to believe that money feeding into politics is the problem behind many ills in our democracy. But is it not perhaps a symptom of a deeper problem? The federal government has claimed, more or less successfully, the power to do pretty much anything under the guise of tax and regulatory authority, subject only to voter backlash. Is it a surprise when affected and potentially affected parties do whatever they can to defend themselves? Is it a surprise that others will look to take advantage of the situation? Consider the incentives: livelihoods and fortunes are at stake. If you want money out of politics, get politicians out of the economy; work for a return to limited government.

John A. Major, A.M. '79
Burlington, Conn.

A most interesting issue, if we consider the articles just a bit out of order. First, we read Lessig's thesis that politicians are spending up to 70 percent of their efforts on raising campaign money, and slowly succumbing to the influences exerted by their wealthy and elite donors, serving those interests rather their constituents'. Then we have Keyssar's article documenting the erosion of constituents' access to the polls, for example to rectify whatever abuses they perceive. As a key next step, we have to appreciate and integrate the James Robinson/Daron Acemoglu study ("Why Nations Fail," July-August, page 9) describing how governing systems that act primarily to promote and serve the interests of "extractive elites" engender backward and uncompetitive societies. Finally, we are taught that politicians' refusal to compromise on matters of principle (driven by campaign positions, thus harking back to donor influences) may render inevitable any consequences that flow from the previously stated circumstances. The question that troubles me is not one of theory and principle as to whether our national cup is half empty or half full, but the more practical consideration of what the nature of its contents is and will be.

Keith Backman, Ph.D. '77
Bedford, Mass.

Ah, if only the peasants would listen to the experts of the professoriate, how much better governed our country would be! They have all the correct answers to the entire human condition, from radically rewriting the Constitution to curing "gridlock" to letting random people, citizens and noncitizens alike, who turn up on election day vote without a photo ID. Never mind that they seem incapable of simple and efficient self-governance of their own microcosm ("Faculty Finance Frustrations," July-August, page 48); they should immediately be placed in charge of our entire government.

Never mind that our Constitution, which works better than that of any other country, has served us well for over 200 years and can be amended but only very slowly and cautiously, which is as it should be. Never mind that it quite deliberately divides power among the three branches of the federal government (and between the House and the Senate in the legislative branch) and between the federal government and the states in order to prevent the concentration of power in few hands and to slow down the hasty enactment of disastrous laws in the heat of the moment ("gridlock" is an uncalled-for pejorative term for this sound and cautious mechanism). Never mind that YouTube shows a white male in his twenties obtaining a ballot for Attorney General Eric Holder, a 61-year-old African-American man, from a poll worker in Washington, D.C.; voter fraud is not a serious problem in our country. Minority voting has actually risen significantly in states which recently enacted voter ID laws.

These three articles collectively remind me why William F. Buckley Jr. spoke so wisely when he commented, "I would rather be governed by the first 1,000 names in the Boston telephone directory than by the faculty of Harvard University."

David Clayton Carrad, J.D. '72
Augusta, Ga.

ON STUDENTS' WELL-BEING

So you give us in one issue Commencement celebrations, excellent tough reasoning on American democracy, Edward Lear, the usual fasci- *(please turn to page 83)*

GIVE CHANCE A CHANCE

Two Steps to Free Will

ASTRONOMY naturally inspires cosmic thinking, but astronomers rarely tackle philosophical issues directly. Theoretical astrophysicist Robert O. Doyle, Ph.D. '68, associate of the department of astronomy, is an exception. For five years, Doyle has worked on a problem he has pondered since college: the ancient conundrum of free will versus determinism. Do humans choose their actions freely, exercising their own power of will, or do external and prior causes (even the will of God) determine our acts?

Since the pre-Socratics, philosophers have debated whether we live in a deterministic universe, in which "every event has a cause, in a chain of causal events with just one possible future," or an indeterministic one, in which "there are random (chance) events in a world with many possible futures," as Doyle writes in *Free Will: The Scandal in Philosophy* (2011). The way out of the bottle, he says, is a "two-stage model" whose origin he traces to William James, M.D. 1869, LL.D. '03, philosopher, psychologist, and perhaps the most famous of all Harvard's professors.

Some of the confusion, Doyle believes, stems from how thinkers have framed the question—in an either/or way that allows only a rigidly predetermined universe or a chaotic one totally at the mercy of chance. David Hume, for example, asserted that there is "no medium betwixt chance and an absolute necessity." But Doyle also finds the term "free will" unclear and even unintelligible, because the condition of "freedom" applies to the *agent* of action, not the will: "I think the question is not proper, whether the will be free, but whether a man be free," in John Locke's concise phrasing. "The element of randomness doesn't make *us* random," Doyle says. "It just gives us possibilities."

Doyle limns a two-stage model in which chance presents a variety of alternative possibilities to the human actor, who selects one of these options and enacts it. "Free will isn't one monolithic thing," he says. "It's a combination of the free element with selection." He finds many antecedents in the history of philosophy—beginning with Aristotle, whom he calls the first indeterminist. But he identifies James as the first philosopher to clearly articulate such a model of free will, and (in a 2010 paper published in the journal *William James Studies* and presented at a conference honoring James; see "William James: Summers and Semesters," November-December 2010, page 61) he honors that seminal work by naming such a model—"first chance, then choice"—"Jamesian" free will.

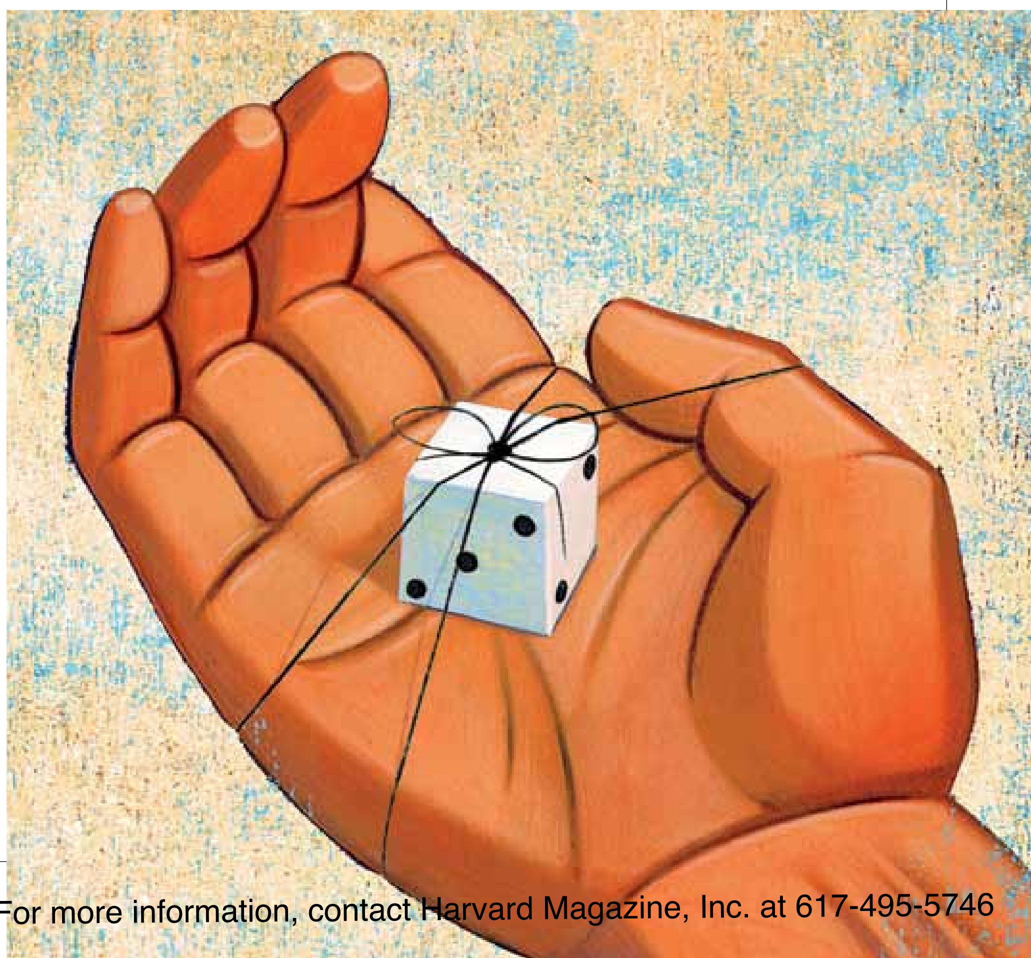

Illustration by Jon Krause

In 1870, James famously declared himself for free will. In a diary entry for April 30, he wrote, "I think that yesterday was a crisis in my life. I finished the first part of Renouvier's [French philosopher Charles Renouvier, 1815-1903] second *Essais* and see no reason why his definition of free will—'the sustaining of a thought *because I choose to* when I might have other thoughts'—need be the definition of an illusion. At any rate, I will assume for the present—until next year—that it is no illusion. My first act of free will shall be to believe in free will."

James identified chance as the source of "ambiguous possibilities" and "alternative futures." "*Chance is not the direct cause of actions*," writes Doyle. "James makes it clear that it is *his choice* that 'grants consent' to one of them [alternatives]." In an 1884 lecture, "The Dilemma of Determinism," James challenged some Harvard divinity students to ponder his choice of a route home after the talk. "What is meant by saying that my choice of which way to walk home after the lecture is ambiguous and a matter of chance?….It means that both Divinity Avenue and Oxford Street are called but only one, and that one *either* one, shall be chosen. The notion of alternative possibility…is, after all, only a roundabout name for chance."

Chance and randomness, however, are concepts that make many academics uncomfortable. "Philosophers and mathematicians hate probability," says Doyle. "All the great mathematicians—Laplace and Gauss, for example—did not believe chance was real. 'Laws of chance,' as they call probability—are only able to describe events, but there is no *real* chance, because God clearly knows what's going to happen. Most of these thinkers—centuries ago—were very religious. And even today mathematicians like to think someday we'll discover the 'laws of chance'—which makes randomness sound regular and lawful."

In the life sciences, where results depend not only on abstract cerebral processes but data that stream in from nature, chance gets more respect. James was highly conversant with Charles Darwin's work, in which evolutionary theories embraced random mutations of genes. More recently, German neurobiologist and geneticist Martin Heisenberg (son of physicist Werner Heisenberg, winner of the Nobel Prize for his work on the uncertainty principle) published a 2009 *Nature* article on free will (with a letter from Doyle), describing how the bacterium *Escherichia coli* moves in two ways: either tumbling randomly or heading purposefully forward. "This 'random walk' [of tumbling] can be modulated by sensory receptors, enabling the bacterium to find food and the right temperature," Heisenberg writes. Thus, a two-stage process combining chance with choice might even apply at the unicellular level of life.

Quantum physics, by putting physical science on a probabilistic footing, erased any ambitions to remove randomness from its equations. British astrophysicist Arthur Stanley Eddington (1882-1944) even declared, "Now that physics is no longer deterministic—because of quantum physics—the door is open to free will," reports Doyle. "And the philosophers said to him, '*What*? You think a free electron makes *us* free?'" Eddington eventually backed off his position, but subsequent decades of work have only strengthened the claims of the quantum model. "Quantum physics makes predictions to 14 decimal places," Doyle says. "It's the most accurate of all mathematical physical theories." Randomness and even free will, it appears, are fully compatible with some highly precise determinations.

~CRAIG LAMBERT

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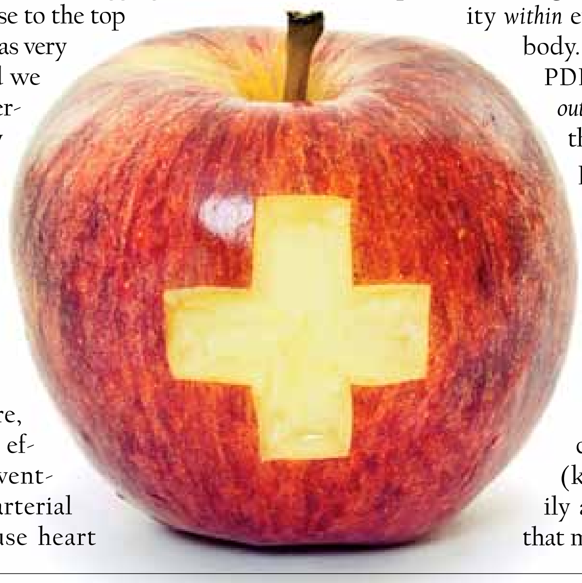
MEDICINAL McINTOSH

Curbing Clots

The old adage "An apple a day keeps the doctor away" now has science to back it up: Harvard researchers have found that rutin, a substance contained in that fruit (as well as in onions, buckwheat, and tea), has potent anticlotting powers that could help prevent heart attack and stroke.

Researchers discovered rutin's antithrombotic property when they screened a set of 5,000 compounds for their ability to block the action of a key protein involved in the formation of vessel-clogging blood clots. When rutin rose to the top of the list, "It was very surprising, and we still don't understand exactly why it is so potent," says associate professor of medicine Robert Flaumenhaft, the study's senior author.



JAMES MCQUILLAN/ISTOCK IMAGES

What's more, rutin could be effective at preventing both the arterial clots that cause heart attacks and strokes and the venous clots that cause deep-vein thrombosis and pulmonary embolism, even though the two types form by somewhat different mechanisms. Existing anticlotting drugs (aspirin, Plavix, Coumadin/warfarin) target one clotting mechanism or the other.

Indeed, if scientists had tried to design a clot-preventing molecule, they could scarcely have created one more perfect than rutin. The protein it blocks—PDI (protein disulfide isomerase)—is essential for protein folding, a critical activity *within* every cell of the body. Rutin inhibits PDI activity only *outside* cells, where the protein's clot-promoting activity takes place.

Health-conscious consumers may be familiar with rutin: it is one of a class of substances called flavonoids (known primarily as antioxidants that may help prevent

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PERSONAL BANKING | BUSINESS BANKING | WEALTH MANAGEMENT cancer and slow aging), and is already sold as a nutritional supplement. Because the Food and Drug Administration has already granted it "generally recognized as safe" status, fewer regulatory hurdles apply to the clinical trial Flaumenhaft and his colleagues are beginning to conduct.

Research in humans has not yet compared rutin directly with widely used antithrombotic medications, but one thing is already clear: those medications are not effective enough on their own. People who have one heart attack or stroke are usually prescribed one of them, yet each year there are 400,000 recurrences—a subsequent heart attack or stroke in a patient who's already had one—in the United States. "Thrombotic disease kills more Americans than cancer, than HIV, than anything else," says Flaumenhaft. "If you have a drug that improves upon existing options by even 2 or 3 percent, that would still be many thousands of lives saved."

~ELIZABETH GUDRAIS

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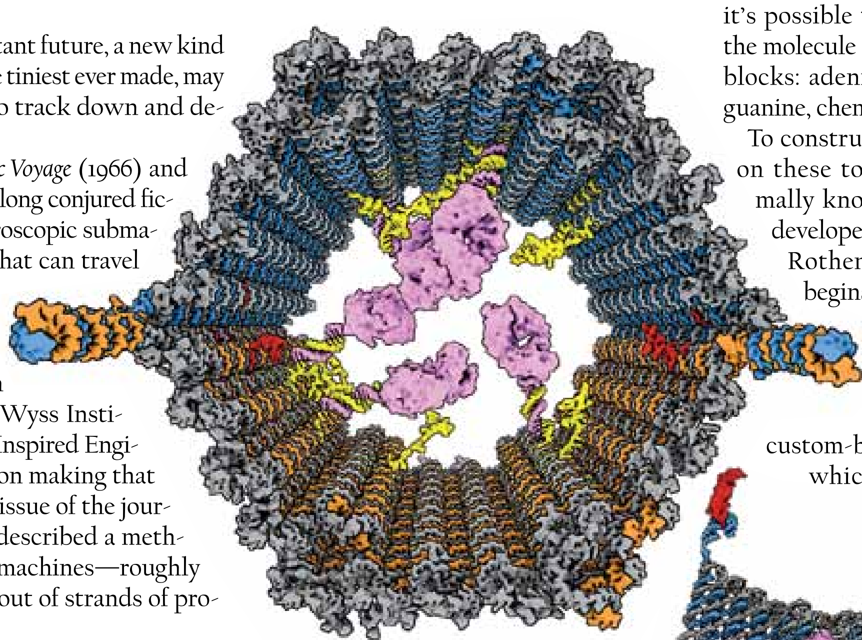
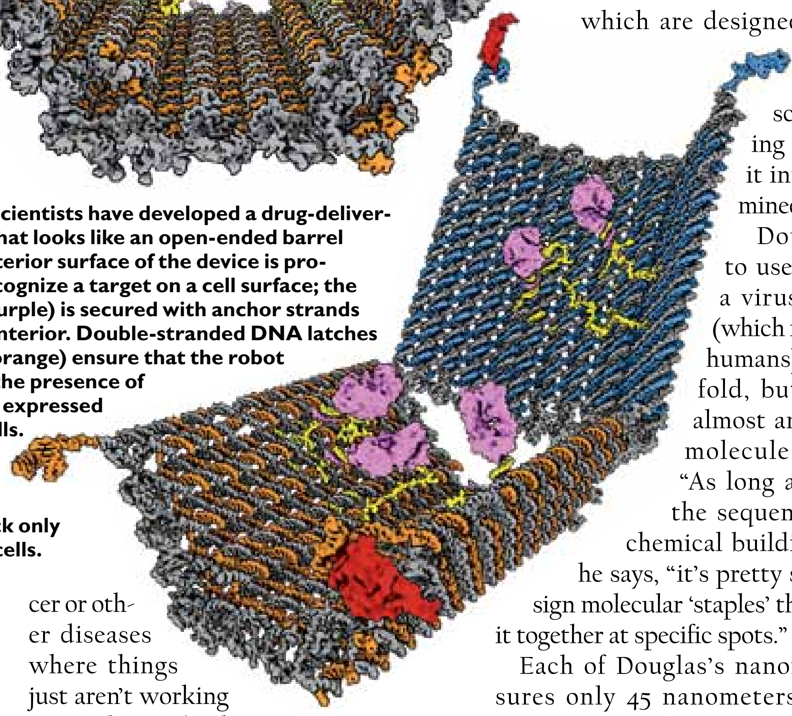
NANO TRANSPORT

Cancer-fighting Robots

In the not-so-distant future, a new kind of robot, one of the tiniest ever made, may have the ability to track down and destroy cancer cells.

Films like *Fantastic Voyage* (1966) and *Innerspace* (1987) have long conjured fictional images of microscopic submarines or machinery that can travel inside the human body to cure ailments. Now Shawn Douglas, a research fellow at Harvard's Wyss Institute for Biologically Inspired Engineering, is working on making that a reality. In a recent issue of the journal *Science*, Douglas described a method for creating tiny machines—roughly the size of a virus—out of strands of protein and DNA.





Wyss Institute scientists have developed a drug-delivering nanorobot that looks like an open-ended barrel (above). The exterior surface of the device is programmed to recognize a target on a cell surface; the drug payload (purple) is secured with anchor strands (yellow) to the interior. Double-stranded DNA latches (blue, red, and orange) ensure that the robot unlocks only in the presence of a molecular key expressed by the target cells. That opens the device (right), enabling the payload to attack only the designated cells.

These devices, dubbed "DNA nanorobots," are short hexagonal tubes made of interwoven DNA that can open along their length like a clamshell. At one end is a DNA "hinge," and at the other, a pair of twisted DNA fragments that act as "latches" to hold the device shut. Inside the nanorobot, Douglas can enclose molecules of almost any substance, essentially turning it into a molecular "delivery truck" that can transport medication to specific cells in the body.

"Our goal is to make tools that can zero in on malfunctioning cells," he says. "We want to be able to fix things when they break—when cells go haywire due to cancer or other diseases where things just aren't working correctly. To do that, I think it makes sense to master this kind of nanoscale construction."

As it turns out, says Douglas, DNA is an ideal material for building at the nanoscale level. Well-developed tools are already in place to understand, manipulate, and even manufacture it. Using computers and special machines called DNA synthesizers, it's possible to create custom lengths of the molecule out of its four basic building blocks: adenine, cytosine, thymine, and guanine, chemicals known as nucleotides.

To construct his devices, Douglas calls on these tools and a technique informally known as "DNA origami," first developed by Caltech researcher Paul Rothemund in 2006. The process begins with a single long strand of DNA that Douglas uses as a backbone or "scaffold" for a structure. That strand is mixed with short chunks of custom-built DNA he calls "staples," which are designed to bind to specific sections of the scaffold, bending and twisting it into pre-determined shapes.

Douglas chose to use the DNA of a virus called M13 (which is harmless to humans) as his scaffold, but notes that almost any long DNA molecule will work. "As long as you know the sequence [of those chemical building blocks]," he says, "it's pretty simple to design molecular 'staples' that will pinch it together at specific spots."

Each of Douglas's nanorobots measures only 45 nanometers long by 35 nanometers wide—minuscule compared to the 75,000-nanometer width of an average human hair. The advantage of a machine this small, he says, is that it can

Images courtesy of Shawn M. Douglas / Wyss Institute for Biologically Inspired Engineering directly interact with the surface of individual cells.

The nanorobots can also track down specific cell types, thanks to their molecular "latches." Those two strands of twisted DNA fragments, known as aptimers, can be designed to react to a specific chemical marker, or ligand, on the surface of a particular cell type, such as those in a cancerous tumor. When they come in contact with that ligand, they bind to it and unfurl, allowing the device to open and release its contents. "It's kind of like the space shuttle—you can put any payload you want in it," Douglas explains. "What you use is going to depend on the application."

At the moment, he is designing DNA aptimers that unravel in the presence of platelet-derived growth factor (PDGF), a protein that regulates cell growth and division. In cancerous cells, PDGF is overexpressed on the outer cell membrane, providing what is essentially a chemical beacon for his nanorobots.

Douglas hopes that by targeting specific cells in this way, his devices can help treat diseases like cancer without the need for traditional chemotherapy, which releases toxic agents throughout the body. "Those drugs might shut down cancer cells," he says, "but they also shut down all sorts of good processes that we want to keep going," leading to hair loss, nausea, and other side effects. His nanorobots, by contrast, could deliver medication directly to cancerous tumors, cutting down on the doses needed to reprogram or destroy rogue cells by delivering only tiny amounts directly to those cells themselves.

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Visit harvardmag.com/extras to see a video explaining how nanorobots work.

He is currently attempting to use nanorobots to attach antibodies to the surface of cancer cells, a process that could give the body's immune system a way to identify and destroy those cells on its own. Initial experiments done in vitro look promising, and he hopes to accelerate production of the devices in order to use them for studies with lab animals within the next few years.

~DAVID LEVIN

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Montage

Art, books, diverse creations

Laurie Krasny Brown in her studio on Martha's Vineyard

The Art of Paper

Works not on, but built from, paper

by CRAIG LAMBERT

In 2000, a turning point came as Laurie Krasny Brown, Ed.D. '78, sat in her studio on Martha's Vineyard, holding a contract to write two more children's picture books for Little, Brown & Company. Starting in 1986, she had collaborated on 14 such books with her husband, Marc Brown, the prolific children's-book illustrator and author (best known for his Arthur the Aardvark series). The couple had created nonfiction books explaining health, death, divorce, travel, and more through the eyes of dinosaurs (e.g., *When Dinosaurs Die: A Guide to Understanding Death*), plus similar books on sexuality (*What's the Big Secret?*) and friendship (*How to Be a Friend: A Guide to Making Friends and Keeping Them*). She wrote the books, and he illustrated them.

But Krasny Brown, too, has a lively visual imagination—"You have to picture what is on every page to write these books"—and always provided art notes that her husband could use as he saw fit. She had also done a solo book, *The Vegetable Show* (1995), that presented its subject in the guise of a vaudeville show starring zucchini, tomatoes, and other vegetables. She illustrated it with her own cut-paper collages, and took a special satisfaction from that project.

She decided not to sign the book contract. "I needed to do art full time," she explains. "I would feel remorse if there were things lurking in me that I never tried." So she turned to making art in her favorite medium: paper.

Her abstract, tightly organized, colorful geometric collages and assemblages of cut paper call to mind quilts, basketry, weaving, and often boxes and other containers. "Paper is a material that is accessible, flexible, beautiful, and sometimes forgiving," she says. "Paper can be full of mystery. I like dyeing it, painting it, manipulating it." She buys rolls of white French archival paper

Photograph by Randi Baird

OPEN BOOK

Over and Done

Each life, obviously, confronts an ultimate exit. But there are plenty of lesser exits—departures, if you will—along the way. In her new book, *Exit: The Endings That Set Us Free* (Farrar, Straus and Giroux, $26), Sara Lawrence-Lightfoot, Fisher professor of education, deploys her skills as sociologist and storyteller to probe these transitions. From the introduction:

I have always been fascinated by exits, endings, leave-takings—by the ways in which we say goodbye to one another, to the lives we've led, to the families we've been part of, to the children we've nurtured, to the organizations we've worked for, to the communities where we've belonged, to the identities that have defined us, to the roles that have given us purpose and status. My curiosity includes exits big and small, those goodbyes that are embroidered into the habits of our everyday encounters as well as those that are forever memorable and rock our worlds. Those that go unnoticed and underappreciated and those that are accompanied by elaborate rituals and splendid ceremony. I have been just as intrigued by the ordinary exits that punctuate our days—goodbyes at the door as our children leave for school each morning…, hugs at the airport as we leave to go on a trip, farewells to our students at the end of the school term—as I am about the leave-takings that become the major markers of our lives: the rupture of a long friendship; the dissolution of a marriage; the death of a parent; the departure of our children for college; the decision to leave a lifelong career; the abrupt firing of a veteran employee; the exits from the "closet," the priesthood, our countries of origin.

I think there must be some relationship between our developing the habit of small goodbyes and our ability to master and mark the larger farewells, a connection between the micro and the macro that somehow makes the latter smoother and more bearable because one has successfully accomplished the former. I certainly believe that the art of attending to, practicing, ritualizing, and developing a language for leave-taking in the most ordinary moments and settings augurs well for taking on the more extraordinary exits that life is sure to serve up.

…I am particularly curious about how people revisit and reconstruct their moments of decisionmaking, the setting in which they make the decision to move on or have the epiphany that something is over and done. What actually happens—in the noise and the silences—that provokes the moment? What are the events that anticipate the climax and precipitate the exit? How is the decision communicated and to whom? What is the tone and texture of the encounter? Is there anger, sadness, relief, or resolution in the aftermath; ambivalence or closure; feelings of loss or liberation? Whom do people turn to for support, reassurance, and validation?

and colors it with gouache, typically immersing a sheet in a bath until it turns the desired hue. Krasny Brown also makes her own paper, and this fall is part of a show, *The Art of Handmade Paper,* at the Featherstone Center for the Arts on Martha's Vineyard, where she and Marc have long had a home.

The notion of "making art in an informal way" appeals to her, and she has always drawn inspiration from American folk art, which is often anonymous. Nineteenth-century piecework quilts, for example, gave her the idea of executing similar designs two-dimensionally in paper. In 2009 she had a solo invitational exhibit at the American Primitive Gallery in Manhattan, which specializes in folk and "outsider" art (works created outside the "official" art culture). "I've been begging to be considered an outsider because I'm self-taught, and I love a lot of the outsider work—it's less self-conscious," she says. "But the gallery owner at American Primitive says I'm not an outsider, because I know too much!"

She enjoys simplicity and repetition with variations. A pianist who attended the High School of Music and Art in New York City and remains a student of classical piano, Krasny Brown says she takes "clues from composers like Bach and Beethoven—the way they do variations on a theme. The simplest melodies can be modified over and over again, and the piece as a whole becomes greater than the sum of its repetitions. I find that brilliant, and try to bring some of that sense of subtle and worthy variations to my art, working with simple shapes: the circle, square, cube, sphere, triangle, cone, pyramid. Why not notice those small changes?"

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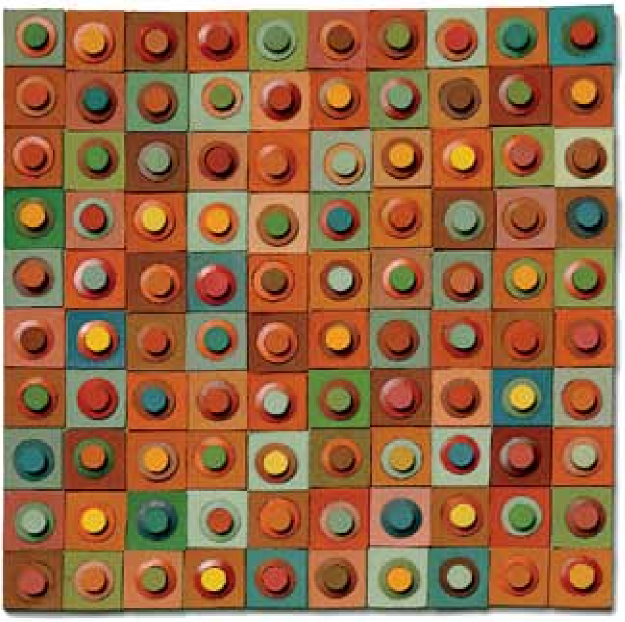
Visit harvardmag.com/extras to view a photo gallery of Krasny Brown's work.

Krasny Brown studied child psychology at Cornell and then earned a master's degree in educational psychology at Columbia. She worked as an educational toy consultant to FAO Schwarz and had a consumer-research job for children's goods in New York. But there, the goal was always getting the child "to ask Mom to buy this," she says. "I felt that this was going to rub me the wrong way ethically."

After decamping for the Harvard Graduate School of Education, she joined the staff of Project Zero, the research group on learning and creativity, and co-directed a grant with Hobbs profes-

Illustration by Mikey Burton



GARY MIRANDO

Plugging Away

GARY MIRANDO

Strain and Sip

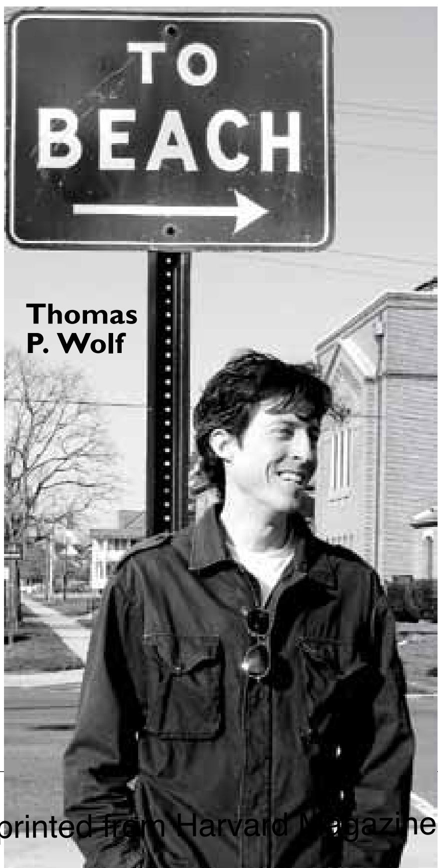
sor of cognition and education Howard Gardner on how media affect children's learning. Her book *Taking Advantage of Media: A Manual for Parents and Teachers* (1986) describes research comparing storytelling media—voice, radio, picture books, film/television—to discern what each medium can distinctively contribute to children's cultural education.

Her husband, though, has called Krasny Brown "an artist in psychologist's clothing," and at their 1983 wedding, remarked that he could tell she was an artist by the way she had arranged objects in her refrigerator. ("It's all art to me," she says.) Indeed, she often uses "things you surround yourself with and use every day" in her works (www.laurenekrasny-brown.com). For example, *Plugging Away* (2011) rings the changes on a series of small wooden plugs that the artist sanded, painted, and mounted on a board. *Strain and Sip* (2008) combines metal sink-drain inserts with tabs taken from to-go lids for coffee cups. During her 2010 residency at the Apothiki Art Center on the Greek island of Paros, Krasny Brown created a "paper café" that had a table set with paper cups, grooved plates, and paper cookies she had made. Her current work involves whimsical variations on boards for games like Parcheesi or checkers, and "game tracks"—pathways that players take around the board for Monopoly or Chutes and Ladders.

GARY MIRANDO

Game Track

"Paper is not so durable, and people get nervous about it," she explains. "But it holds up pretty well." And paper remains her Muse. "If I worked in fabric," she says, "I would make it look like paper."



Thomas P. Wolf

NORA WOLF

Fiction in Counterpoint

A novel, Sound, *notated like a musical score*

In 2005, while waiting to pay in the Bob Slate stationery store in Harvard Square, Thomas P. Wolf '05 spotted a Moleskine composer's notebook with gray-lined staves on the pages. "It was something I wanted to mess around with," he says. He bought it. Though no composer, he began to doodle in the notebook—with words. "Like a musical score, you could use it to display things happening simultaneously," he explains. "Like people interrupting or talking over each other. You could show characters thinking things while saying other things."

Years later, the doodling has evolved into Wolf's first work of fiction, the recent novel *Sound*, published under the pen name T.M. Wolf. Its format is innovative: like a musical score, pages have horizontal lines that underline verbal "audio tracks": dialogue among the characters (identifiable by typeface), ambient noise, song lyrics heard on radios (especially hip-hop), play-by-play broadcasts of New York Yankees baseball games, and characters' unspoken thoughts. Like a musical recording, the layered tracks overlap. "If you're going to try something new, you want to go all out," Wolf says. "Still, it's such a structured form—there are certain things you can't say. You can't write straight dialogue, for example."

The layered tracks force a kind of immediacy on the reader, heightening awareness of sound and time. Furthermore, "Space on the page is important," Wolf says, "and can be manipulated." Paragraphs of conventional prose intermingle with the "audio" sections. For example, Wolf describes the seaside New Jersey town where the novel

Off the Shelf

Recent books with Harvard connections

Interop, by John Palfrey '94, J.D. '01, and Urs Gasser, LL.M. '03 (Basic Books, $28.99). Palfrey, formerly of the Law School and now headmaster of Phillips Academy Andover, and Gasser, executive director of the Berkman Center for Internet & Society, advance a theory for optimum interoperability, to achieve "the promise and perils of highly interconnected systems" (their subtitle)—yielding, say, better medical records and averting invasions of privacy and other disasters.

ALEX HARRIS

The Murphy High School Marching Band before a game in Mobile, Alabama, captured in *Why We Are Here*

We Shall Not Be Moved, by Tom Wooten '08 (Beacon Press, $25.95). The title is literal: narratives of the community leaders who stayed in and worked to rebuild New Orleans neighborhoods in the wake of Hurricane Katrina.

Restoring Trust in Organizations and Leaders, edited by Roderick M. Kramer and Todd L. Pittinsky (Oxford, $59.99). A pair of social scientists solicited colleagues' views, in writing and via a Harvard Kennedy School conference, on the "dramatic and deeply troubling decline in trust" in entities and people, private and public. Many of the respondents are leading Harvard professors, including Iris Bohnet and Richard Zeckhauser (Kennedy School), Amy Edmondson (Business), and Howard Gardner (Education).

Nuclear Forces, by Silvan S. Schweber (Harvard, $35). The author, an associate of the department of the history of science (and an emeritus professor at Brandeis), examines in depth the early life and development of Hans Bethe, the towering physicist whose work subsequently led him both to help develop and then to denounce the atomic bomb.

Jobs for the Boys: Patronage and the State in Comparative Perspective, by Merilee S. Grindle, Mason professor of international development (Harvard, $45). The author, director of the David Rockefeller Center for Latin American Studies, examines patronage as a centuries-old system of public service in developed and developing nations, in contrast to the merit-based (and purportedly corruption-free) systems intended to supplant it.

America the Philosophical, By Carlin Romano (Knopf, $35). Is the title a joke, like "Canada the Exhibitionist"? asks the author, a professor at Ursinus, columnist, and critic. He then argues, brilliantly and at length, that it is not, along the way invoking all the Harvard giants: James, Peirce, Santayana, Rawls, Quine, Nozick, Skinner, et cetera.

The Annotated Brothers Grimm, edited by Maria Tatar, Loeb professor of Germanic languages and literatures and of folklore and mythology (W.W. Norton, $39.95). Revealingly annotated and beautifully illustrated, for the bicentennial.

Why We Are Here: Mobile and the Spirit of a Southern City, by Edward O. Wilson, Pellegrino University Professor emeritus, and Alex Harris (Liveright, $39.95). Naturalist Wilson's memoir of his Alabama family and childhood, and of the downs and ups of his emotional home, is beautifully accompanied by the Duke documentary photographer's images.

Renaissance Gothic, by Ethan Matt Kavaler '80 (Yale, $75). A scholarly, sumptuously illustrated consideration of the late Gothic in such iconic monuments as King's College, Cambridge, that disentangles the style from the Italian Renaissance. The author is professor of art history at the University of Toronto.

Regenesis: How Synthetic Biology Will Reinvent Nature and Ourselves, by George Church, Winthrop professor of genetics, and Ed Regis (Basic Books, $28). An enthusiastic report on the potential for, say, engineering susceptibility to viruses out of humans, by one of the world's leading genomic scientists and a coauthor. Food for thought, in the transition from "Genesis" to "gene" science to the deliberate shaping of evolution.

A Year Up, by Gerald Chertavian, M.B.A. '92 (Viking, $26.95). The founder and CEO of Year Up explicates how to cross the "opportunity divide" that keeps disadvantaged youth off, or far down on, the job ladder; his organization provides a structured year of training and mentorship meant to get them to higher rungs.

Julian Bell: From Bloomsbury to the Spanish Civil War, by Peter Stansky, Ph.D. '61, and William Abrahams '41 (Stanford, $45). The two authors wrote four books together, including an earlier assessment of Bell, in *Journey to the Frontier.* Now, Stansky, a Stanford historian, has revisited the Bloomsbury poet, drawing on new archives; he retains Abrahams, an acclaimed editor, as coauthor, 13 years after his death.

The World Without You, by Joshua Henkin '87 (Pantheon, $25.95). The author's third novel, set in 2005, draws upon the murder of journalist Daniel Pearl in Pakistan, but focuses on its fictional family's loss, not on geopolitics and terrorism. Critic Adam Kirsch '97 calls the author a "novelist of distinguished gifts."

is set: "…demolition crews were imploding the burnt remains of the motels and apartment buildings that had once crowded the beachfront; in the place of whole blocks, craters; around the craters, chain-link fences; on the fences, a paper-thin city in watercolor and pasteboard, equally 1890s, 1920s, and 2020s; above the watercolors, new buildings in brick and steel and shiny green glass." (Wolf constructed a "geographic remix of the shore" on his wall to help orient the narrative, using downloaded Jersey-shore images from Google Maps.)

Sound's protagonist, Cincy Stiles, drops out of a stalled graduate-degree program and takes a job overseeing a boatyard in his hometown. He rooms with a high-school pal, an idiosyncratic musician; hires a motley crew of workmen; pursues an elusive love interest, Vera (named for Nabokov's wife); and gets into mid-sized trouble with the law. Music is a leitmotif. "I listen to a tremendous amount of music," explains Wolf. "Hip-hop informs everything I know about music since age eight." For a few years in his early twenties, he wrote reviews of hip-hop releases for sites like okayplayer.com.

HM▶ Visit harvardmag.com/extras to hear Wolf read a remixed portion of his book.

He grew up in Brielle, south of Asbury Park on the Jersey shore—Bruce Springsteen country. He attended Catholic schools before Harvard, where he was a "middling high-jumper" on the track and field team and studied intellectual history, graduating summa cum laude. His historical studies continued at Emmanuel College, Cambridge, on a Marshall scholarship; next he took an urban-development degree at University College London before returning to the States in 2007. The next year he worked full-time as a field organizer for the Obama campaign. Wolf's next graduate degree was a J.D. from Yale Law School (his father is an attorney, his mother a judge); he now clerks for a federal judge in Connecticut.

Something in the author's name may correlate with stylistic originality: novelist Thomas Wolfe, A.M. '22, and journalist/novelist Tom Wolfe both broke new ground in their literary forms. To deepen the confusion, Wolf's publisher, Faber and Faber, is an affiliate of Farrar, Straus, and Giroux (FSG), Tom Wolfe's publisher. To avoid confusion, Tom Wolf took the pseudonym T.M. (dropping the *o* from *Tom*) Wolf. Even so, on his first visit to the FSG offices, he confused the receptionist a bit by introducing himself as "Tom Wolf." The spellings are different, so any ambiguity is purely in the ear—appropriate, perhaps, for the author of *Sound*. ~CRAIG LAMBERT

Three for the Mode

Jazz pianist Steve Kuhn proves good things come in trios.

by LARA PELLIGRINELLI

PIANIST AND COMPOSER Steve Kuhn '59 has played in formidable quartets and quintets, inventive big bands, graceful string orchestras. He's also won admiration as a thoughtful and articulate soloist. But despite the range of company he's kept throughout a five-decade career in jazz, Kuhn has always returned to the piano trio, his favorite setting since he became a bandleader in the 1960s.

"The interpretation of the song is in my hands," he explains. "At the same time, it's conversational. Rather than having bass and drums provide an accompaniment, the musicians respond to me. I respond to them. The music passes between us and we all have an equal part in it."

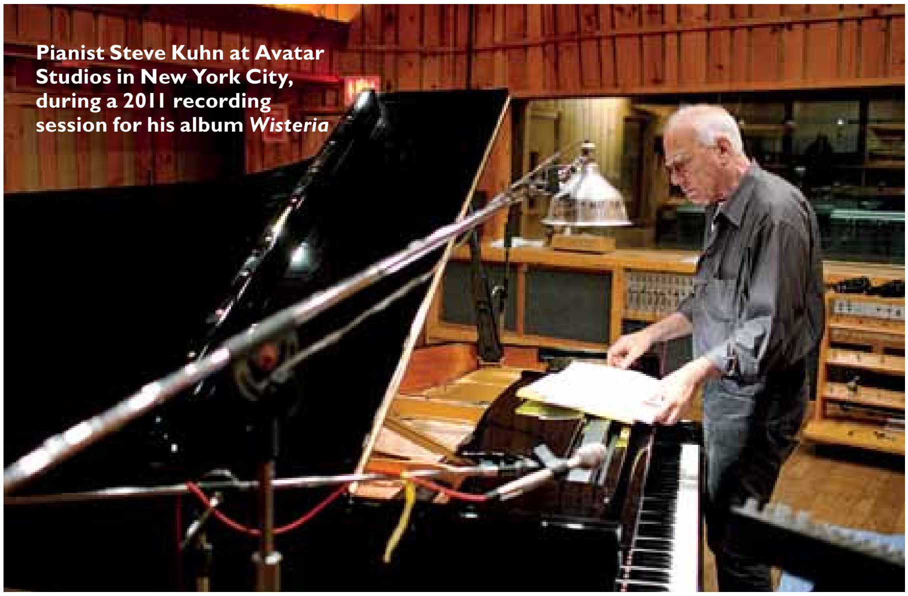
For *Wisteria*, his latest CD, Kuhn (http://stevekuhnmusic.com) pursued that kind of intimate dialogue by selecting two musicians with whom he enjoys an extraordinary level of comfort: bassist Steve Swallow and drummer Joey Baron. "The three of us had never played before as a group," Kuhn says, "but Joey and I go back 20 some-odd years. He has an infectious spirit and it gives the music a certain color. Swallow and I go back over 50 years. He's the brother I never had." Kuhn was 25 when he and the bassist met, working side by side in the rhythm section for venerated trumpeter Art Farmer.

Kuhn always had a clear direction. "From the time I was babbling as a baby," he says, "this was the only thing that I ever wanted to do." That's barely an exaggeration. A child prodigy, he could identify the records of Benny Goodman, Count Basie, and Duke Ellington before he could really talk, by picking out the labels. The feat was so incredible that humorist H. Allen Smith, who learned of it, Kuhn has reported, from a family friend, concluded his best-selling 1941 collection, *Low Man on a Totem Pole*, with his impressions of the precocious toddler.

As a teenager in Boston, Kuhn studied with distinguished pianist and jazz sympathizer Margaret Chaloff, whom he credits with enabling him to get a broad spectrum of color from the piano. Her son Serge became a well-known jazz baritone saxophonist as well as Kuhn's friend and early collaborator. "People like Charlie Parker and Dizzy Gillespie knew her because of Serge," Kuhn says. "Many of the pianists who came to Boston to play at [jazz clubs] Storyville and the Hi-Hat would call her for a lesson."

Kuhn had his own gigs at Storyville playing solo piano as a teen. At Harvard, he studied music theory by day with Walter Piston and led the house trio at a club in Harvard Square, the Mount Auburn 47 (better known as the Club 47), five nights a week. After graduation, he won a scholarship to the Lenox School of Jazz from Schaefer Brewing (which featured jazz artists promoting its beer). The renowned faculty, which, during Kuhn's summer there, included members of the Modern Jazz Quartet, George Russell, and Gunther Schuller, mixed freely with the "students"—emerging talents like soon-to-be avant-garde icon Ornette Coleman. When Kuhn moved to New York weeks later, trumpeter Kenny Dorham, one of his Lenox teachers, hired him as the pianist for his quintet. In the next few years, Kuhn worked with legends John Coltrane, Stan Getz, and Art Blakey, leading to his job with Art Farmer.

"Wisteria," the title track from Kuhn's new release, is one of Art Farmer's lesser-known compositions. "He never played it when I worked with him in 1964," Kuhn recalls. "I knew it from an old 10-inch



Pianist Steve Kuhn at Avatar Studios in New York City, during a 2011 recording session for his album *Wisteria*

©JOHN ROGERS/ECM RECORDS

Prestige LP recorded in the early 1950s. It always stuck with me. I hunted down a lead sheet because I wanted to see exactly how he wrote it, and it was very simple." Kuhn eases through the melancholy ballad warmed by Baron's cymbal work and Swallow's resonant bass tones. Swallow's instrument, a modified electric five-string (rather than the acoustic instruments most jazz musicians prefer), sounds particularly guitar-like as it sweetly climbs into the upper register for his solo.

Two of Swallow's compositions also appear on *Wisteria*: the moody "Dark Glasses" and stylish "Good Lookin' Rookie," both offering ample playgrounds for the musicians' improvisations. "He's one of my favorite composers," Kuhn volunteers. "I've played more of his songs than those of any other composer—except for myself."

Most of the compositions on the album are indeed Kuhn's own. "Adagio," "Morning Dew," "Pastorale," and "Promises Kept"—all written for a gorgeous string orchestra recorded on *Promises Kept* in 2000—were originally pretty yet sparse, keeping the nonswinging string players tethered to the arrangements. It was a challenge to recast them for the trio, but one Kuhn eagerly undertook because the smaller number of performers would offer more frequent opportunities to play the pieces. "We could be so much freer," Kuhn states. "Having an orchestra is an amazing gift, but there's nothing we couldn't say with just the three of us."

HM▸ Visit harvardmag.com/extras to listen to several of Kuhn's songs.

America the *Politically* Unequal

Can the nation really secure the rights of citizenship?

by ANDREA LOUSE CAMPBELL

Illustration by Pete Ryan

RECENT EVENTS have focused attention on two of the most consequential phenomena of our time: growing economic and political inequality. Although the Occupy Movement of 2011 seems to be petering out, it did draw attention to the tremendous gains made by the economy's winners, whose incomes have soared during the past four decades, while those of middle-income and poorer Americans have stagnated. The Super PAC (political action committee) phenomenon of the 2012 election cycle, in which individual donors write multimillion-dollar checks to support candidates (just as they did in the pre-Watergate, pre-campaign finance reform era), highlights growing political inequality and the ability of the very rich to speak far more loudly than other citizens.

In *The Unheavenly Chorus*, Kay Lehman Schlozman (Moakley endowed professor of political science at Boston College), Sidney Verba '53, LL.D. '09 (Harvard's Pforzheimer University Professor emeritus), and Henry E. Brady (dean and professor of public policy at Berkeley's Goldman School of Public Policy) present a timely and wide-ranging analysis that catalogs and describes the nature and magnitude of political inequality in the United States. They show that Americans strongly uphold and desire political equality, recognizing that democracy depends on the ability of all citizens to make their preferences known. At the same time, Americans tolerate high levels of economic inequality, viewing the market's rewarding of some citizens far more than others as a necessary incentive for individual and societal productivity.

But as the authors point out, one set of values undermines the other: political participation rates in the United States vary tremendously by class, with more affluent and educated individuals far more likely to participate in every kind of political activity. The disparities are smaller for time-based activities like working on campaigns (each of us has only 24 hours in a day) and greatest in donating money. They exist for voting (it's not "one man, one vote" but "lots of non-rich people, no vote") and even protest, supposedly a weapon of the weak. Everywhere in the participatory universe, economic inequality undercuts the possibilities for political equality.

Does it matter that some participate less than others? Absolutely, because those who are active have different policy preferences than those who are not. The authors combine income and education into an index of socioeconomic status and show that high SES individuals are far more conservative on economic issues. The fact that their voices dominate while the poor and even the middle class are ignored moves economic policy in the United States to the right and undercuts the interests and well-being of less-privileged citizens.

Kay Lehman Schlozman, Sidney Verba, and Henry E. Brady, *The Unheavenly Chorus: Unequal Political Voice and the Broken Promise of American Democracy* (Princeton, $35)

Indeed, this analysis addresses one of the central puzzles in American politics: why is economic policy so conservative? The United States is nearly the richest country in the world in per capita gross domestic product, but has the highest poverty rate among advanced industrialized nations: Why is there so little redistribution from rich to middle class and poor? Why and how can politicians ignore the median citizen, whose economic preferences are more moderate, when the classic political models indicate that politicians should gravitate to the middle in a two-party system?

Because (as the authors demonstrate in perhaps their most fascinating analysis) those who are active in politics have higher incomes and more conservative economic preferences than the median citizen. The median campaign worker, the median donor, and the donor giving the median amount of money, in other words, are richer and economically more conservative than the median *American*—and this is true among both Republican and Democratic activists (although the Republican activists are higher income than their Democratic counterparts). Thus one reason "there is no income confiscation in America" is that "political aspirants seeking the political support needed to be nominated by their parties and to run an effective campaign will be drawn away from the median voter, with clear consequences for policy outcomes."

The analysis also sheds light on another phenomenon distinguishing the current era, political polarization. There is no doubt that elected politicians are polarized: the median Democrat and median Republican in Congress are farther apart than they have been in decades, with little overlap between the parties. This degree of polarization is not unprecedented, but when combined with frequent party-line voting, a supermajority requirement (effectively) in the Senate due to increased threats to filibuster, and an allergy to compromise, it makes for a particularly toxic brew.

A longstanding political-science debate asks whether the public is polarized as well. One authoritative account by Stanford professor Morris Fiorina asserts that the public is not, but rather arranged in a bell curve with its peak in the moderate part of the ideological spectrum. In contrast, *The Unheavenly Chorus* shows that members of the public *are* polarized: the preferences of Democrats and Republicans on both economic and social issues are poles apart. Politically active partisans are even more polarized. And, just as among political elites, "ordinary" Republicans are farther from the median than are "ordinary" Democrats (indeed, over time, Democrats have stayed in place in terms of their policy preferences while Republicans have moved to the right, the same pattern we observe among elected officials).

The dominance of privileged interests continues in the authors' analysis of political inequality among interest groups. Beyond participating as individuals, citizens can also come together in organized groups to press their claims on government. But only a fraction of organized interests with a presence in Washington, D.C., are membership organizations for ordinary people—about one in eight. Instead, business interests dominate, and represent the plurality of lobbying expenditures and PAC donations as well. Ordinary citizens do appear in occupational associations, but these mainly organize high-level workers such as professionals. There are no interest groups at all organizing the recipients of means-tested social programs. Indeed, there are no membership organizations for unskilled, low-skill, blue collar, or service workers—except for unions.

The authors make another important contribution by laying out just how crucial unions are for the political voice of the nonprivileged. Unions are huge players on the political scene: from 1989 to 2009, *half* of the top 25 PACs were unions; between 2001 and 2005, unions made one-quarter of all PAC donations by organized interests. But unions are in decline—only 7 percent of private-sector workers are unionized; and union membership is now dominated by public unions of government workers and teachers (typically white-collar workers, many with college educations)—diminishing unions' traditional role in representing blue-collar and lower-education groups.

Unions' slide results in part from the decline of manufacturing and other changes in employment patterns, as well as the increased willingness of management to fight union demands and organizing drives. But political attacks have been paramount too, with successful efforts by union opponents to secure court decisions and National Labor Relations Board rulings allowing members to withhold portions of their dues from political activity, further undercutting union influence—and thus the political representation of nonprivileged workers.

Indeed, political conservatives and the privileged interests they champion have been intent on eliminating even the remaining slivers of voice the less-privileged have. The attacks on union political activity are one example; passing voter ID laws and aggressively purging voter lists are another [see "Voter Suppression Returns," by Alexander Keyssar, July-August, page 28]. Although the authors comment on these efforts, one wishes for a more visceral reaction: the implications sometimes get lost in the book's sober, measured, social-scientific tone.

Reforms meant to address inequalities may violate other democratic values or social norms.

Is there any hope for ameliorating political inequality? One important finding by the authors is that when voter turnout rises, it is mostly because of increased turnout among lower-SES groups (high-SES groups participate at uniformly high rates over time). This suggests that political mobilization has potential as an instrument of equality. The Internet may help mobilize the young, who are quite underrepresented among the active citizenry, although Internet usage has its own SES gradient and may not mitigate economic inequality among political participants.

In general, finding solutions is difficult. Procedural reforms such as vote-by-mail simply make participation easier for those already active; they do not alter existing inequalities. And reforms meant to address inequalities may violate other democratic values or societal norms: mandating a "participatory floor" through compulsory voting impinges on Americans' sense of liberty; creating a "participatory ceiling" with complete public funding of elections may run afoul of First Amendment protections of money as a form of free speech. Above all, it is unlikely that those who benefit from the present system would ever be willing to entertain reforms that would truly chip away at their near-hegemonic power.

These esteemed authors, who have devoted their careers to the study of political participation, have assembled in 718 pages the most complete compendium of political inequality we have—its definition, sources, magnitude, and consequences—together with a consideration of changes in participatory processes that might alleviate inequalities in political voice. In the end, it is a troubling story about the state of American democracy. One can only hope that we find the will to secure the political rights of citizenship not just on paper, but in reality.

Andrea Louise Campbell '88, professor of political science at MIT, is coauthor of The Delegated Welfare State: Medicare, Markets, and the Governance of American Social Policy *and author of* How Americans Think about Taxes: Public Opinion and the American Fiscal State *(forthcoming).*

Chapter & Verse

Correspondence on not-so-famous lost words

Carol Ochs is looking for a story, possibly titled "Learning Day," from a 1953 science-fiction magazine, in which all children have a chip implanted that enables them to read. They do, briefly, but only the hero continues reading. Later, they are programmed for their professions. The hero, eager to become a computer programmer, is devastated when told he will not be programmed and will have no profession. He and a few other unprogrammed people live in a pleasant cottage and read. He then goes to the Olympics of computer programming, where a former rival is missing a part and loses. The hero eventually realizes that all the others failed programming day and only those not programmed were free to think.

"red Coke can in the snow" (July-August). Valerie Brader suggested in reply "the beginning of chapter 33 of *Expecting Adam,* by Martha Beck ['85, Ph.D. '94], in which she thinks a pink gleam on the ground near the Charles River is rose quartz, but finds it is styrofoam. She wonders if she is 'robbing myself of beauty with my own cognitive prejudice.'" But Charles Hayford, noting that Beck's book appeared well after he began looking for a citation for the anecdote, which took place on the West Coast and "had a Zen element," hopes for other leads.

Send inquiries and answers to "Chapter and Verse," *Harvard Magazine,* 7 Ware Street, Cambridge 02138, or via e-mail to chapterandverse@harvardmag.com.

New England

REGIONAL SECTION

Extracurriculars

SEASONAL

The Farmers' Market at Harvard
www.dining.harvard.edu/flp/ag_market.html
In Cambridge:
Tuesdays, noon-6 P.M. (rain or shine)
26 Oxford Street (new location: in front of the Harvard Museum of Natural History)
In Allston:
Fridays, 3-7 P.M.
Corner of North Harvard Street and Western Avenue
The markets run through October and offer fresh produce, baked treats, herbs, pasta, jams, chocolates, and cheeses, along with cooking demonstrations.

FILM

The Harvard Film Archive
http://hcl.harvard.edu/hfa; 617-495-4700
Visit the website for complete listings.

• Through September 16
Raj Kapoor. A festival exploring the work of this Indian film actor and director of Hindi cinema. Films screened include: *Shree 420, Awarra, Barsaat, Meera Nam Joker, Aag, Bobby, Boot Polish,* and *Jagteraho.*

• September 17
Filmmaker ***Sharon Lockhart*** appears in person to discuss *Double Tide,* her 2009 documentary about a female clam digger in Maine. The changing light in the sky and rhythmic tides also play central roles in the film.

• September 21 through October 1
Werner Schroeter. Screenings of *The Death of Maria Malibran, The Rose King, Malina, Black Angel,* and *Council of Love* celebrate the highly stylized work of this German writer-director whose films span 40 years.

• October 5-22
Michelangelo Antonioni. The retrospective on the legendary Italian filmmaker offers *Blow Up* and *Red Desert,* along with his 1960s "trilogy on modernity and its discontents": *La Notte, L'Avventura,* and *The Eclipse.*

MUSIC

Sanders Theatre
www.boxoffice.harvard.edu; 617-496-2222

• October 12 at 8 P.M.
This year's take on the annual "Montage Concert" is presented by the ***Harvard Monday Jazz Band, Harvard Wind Ensemble,*** and the ***Harvard University Band.***

NATURE AND SCIENCE

The Arnold Arboretum
www.arboretum.harvard.edu; 617-524-1718

• October 29
At 10 A.M.: Weld Research Building, 1300 Centre Street, Roslindale (Boston)
At 7 P.M.: Hunnewell Building, 125 Arborway, Jamaica Plain (Boston)
Gardens for a Beautiful America: The Photographs of Frances Benjamin Johnston Waters. Registration is required for these two events on the work of this pioneering artist who was at the epicenter of the early twentieth-century "beautify America" movement. Johnston captured lush images from a wide range of homes and gardens across the nation. Architectural historian Sam Watters discusses Johnston's important work as well as his own new book on the subject.

EXHIBITIONS

Harvard Art Museums
www.harvardartmuseums.org; 617-495-9400
485 Broadway

• September 20 at 6 P.M.
Images of the Doomed City: The Last Days of Pompeii in the Visual Imagina-

Left to right: From *Wiyohpiyata: Lakota Images of the Contested West,* at the Peabody Museum; a still from Michelangelo Antonioni's *La Notte,* at the Harvard Film Archive; from *Gardens for a Beautiful America: The Photographs of Frances Benjamin Johnston,* at the Arboretum

FROM LEFT TO RIGHT: THE PEABODY MUSEUM OF ARCHAEOLOGY AND ETHNOLOGY; HARVARD FILM ARCHIVE; THE ARNOLD ARBORETUM

NEW ENGLAND REGIONAL SECTION

Kids and adults can learn about teeth, bones, and other remains at the Peabody Museum's zooarchaeology lab.

PEABODY MUSEUM OF ARCHAEOLOGY AND ETHNOLOGY

tion presents a lecture accompanied by a rare look at nineteenth-century depictions of the disaster. In conjunction with this event, the 1926 silent film *The Last Days of Pompeii* will be shown at the Harvard Film Archive on September 23 at 4 P.M.

• September 22
A day-long symposium examines ***Material and Immaterial Aspects of Color*** throughout art forms and history with a host of scientists, artists, curators, and conservators.

• Opening October 9, with an artist's talk on October 24 at 6 P.M.
Recent Acquisitions, Part III: Kerry James Marshall highlights the artist's 12-panel, large-scale woodcut print *Untitled* (1998/2007), which explores domestic activity and society's embedded legacy of racism. Marshall is known for illustrating the struggles of African Americans during the civil-rights movement.

Peabody Museum of Archaeology and Ethnology
www.peabody.harvard.edu; 617-496-1027

• October 8, noon to 4:30 P.M.
Zooarchaeology Lab Family Open House
Bring in a bone to find out where it came from! Recommended for ages 8 and up. Free with museum admission.

• Continuing: ***Wiyohpiyata: Lakota Images of the Contested West*** showcases drawings by Plains Indian warriors along with Lakota objects, such as a majestic feather headdress.

Harvard Museum of Natural History
www.hmnh.harvard.edu; 617-495-3045
The historic ***Fishes Gallery*** has reopened following a major makeover, enabling

Hammond Residential

Cambridge...Five NEW construction, contemporary town homes between Harvard and MIT. TOP QUALITY and ENERGY-EFFICIENCY in the heart of Cambridge. www.FranklinSquareCambridge.com

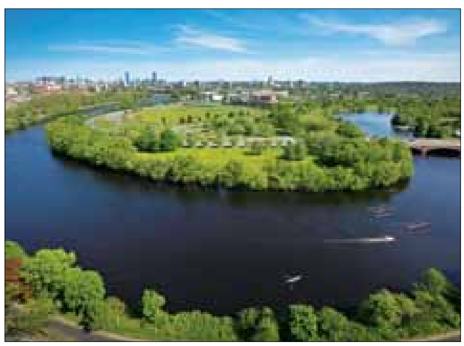
Cambridge...The three Dana Hill Townhouses will be a combination of high quality renovation and new construction, with three-bedroom, two-and one-half-bathroom residences with patios and garage parking in a prime location near Harvard Square. Completion is scheduled for early September. www.DanaHillTownhouses.com

Cambridge...Desirable established Harvard Square doorman building. 2 bedrooms, 2 baths, open entertaining area, lovely views. Balcony. Garage. $1,400,000

Belmont Hill...1930's grand dame. Nestled among pine trees on over two acres. Graciously proportioned rooms. Located near Belmont Hill School and Belmont Country Club. $2,200,000

Arlington...Arlington Center at Cutter's Mill. This lovely 2005 4-level condo has 3 bedrooms, 2.5 baths, and 3 decks! Central air. Gas fireplace. 2-3 car garage. Prof. mgt. $595,000

Medford...A gracious home with meticulously renovated interiors, lush private yard and gardens, deck/patio, and 5 bedrooms and 3.5 baths. $635,000



Cambridge...Rare 20th floor co-op on the Charles River offers glorious Boston skyline views– Elegant 8 rooms, 4 bedrooms, 4 bath, 2 balconies. 24-hr concierge. $4,100,000

Belmont...Glorious Belmont Hill residence on a beautifully landscaped ½-acre lot. 14 room home with 4 bedrooms, 3.5 baths and au pair suite. 3 fireplaces. 2-car garage. $1,250,000

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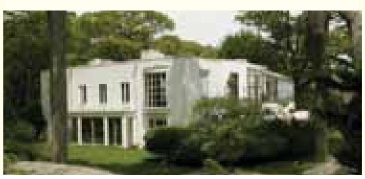



visitors to explore anew the diversity of undersea life "from gars to groupers and stonefishes to sea horses."

LECTURES

Radcliffe Institute for Advanced Study
www.radcliffe.harvard.edu
All events are free and open to the public, although some require registration.
Radcliffe Gymnasium, 10 Garden Street
• September 21, 9:15 A.M. to 4:30 P.M.
Siting Julia: A Julia Child Centenary Symposium
The Schlesinger Library, which houses Child's extensive papers, hosts this event featuring speakers from three "sites" that influenced the chef: post-World War II

A panel from *Untitled* (1998/2007), by Kerry James Marshall, at the Harvard Art Museums

DIGITAL IMAGING AND VISUAL RESOURCES, HARVARD ART MUSEUMS, © PRESIDENT AND FELLOWS OF HARVARD COLLEGE

Paris, Cambridge, and national television. To register, visit www.radcliffe.harvard.edu/event/2012-siting-julia.
• October 12 at 9 A.M.
Cloudy with a Chance of Solutions: The Future of Water offers a roundtable discussion among experts in environmental contaminants, promising technologies, and the role of commercial and governmental interests in water supplies.
• November 2, 9 A.M. to 4:30 P.M.
The ***Take Note*** conference surveys the way notes have been taken across history, among various forms of media, and in different locales, as well as what's changing—or not—in the digital age. To register, visit www.radcliffe.harvard.edu/event/2012-take-note.

Events listings also appear in the *University Gazette*, accessible via this magazine's website, www.harvardmagazine.com.

Museums in Our Midst

Treasure troves worth the trek • *by Nell Porter Brown*

Clockwise from top left: the Lake Champlain Maritime Museum, the Culinary Arts Museum, the New Britain American Art Museum, the Hancock Shaker Village, the Waterworks Museum, and the Willard House and Clock Museum

Even with New England's rich history, it may be surprising to learn that there are hundreds of small museums scattered across the region. "One story of our museums is a sort of a 'tale of two cities,'" says Dan Yaeger, M.T.S. '83, executive director of the New England Museum Association. "There are folks who are doing well, many of whom have expanded and built up a national profile, and there are many others with significant collections who are looking for their next meal." The small Dedham Historical Society in Massachusetts, for example, is home to the Metcalf Chair, carved in 1652—the oldest dated Colonial American-made chair. Among the nearly 10,000 communications-related items at The New Hampshire Telephone Museum (in Warner) is an 1898 oak pay-phone unit that takes silver dollars. The Abbe Museum in Bar Harbor, Maine, depicts the life of the indigenous Wabanaki Nations through artifacts such as sewing needles made of bone. And the New Bedford Whaling Museum in Massachusetts boasts the only permanent exhibit space exploring Portuguese contributions to regional maritime culture. Here are six other small museums that highlight the breadth and depth of New England's holdings.

Culinary Arts Museum

(at Johnson and Wales University)
Providence, R.I. | 401-598-2805
www.culinary.org

"Anyone who eats can find something they can resonate with here at the museum,"

Each image reproduced courtesy of its respective museum

You never actually own a Patek Philippe.
You merely take care of it for the next generation.
PATEK PHILIPPE
GENEVE
Begin your own tradition.
1st CLASS
PULLMAN
Nº 4159 D
LUX BOND & GREEN
JEWELRY WATCHES GIFTS • SINCE 1898
416 Boylston Street · Boston 617-266-4747
46 LaSalle Road · West Hartford 860-521-3015
Annual Calendar Chronograph Ref. 5960R


Culinary Arts Museum

says Richard J.S. Gutman, the director and curator of this 25,000-square-foot treasure trove of anything related to cooking, eating, and hospitality. The 250,000-piece collection includes cookbooks, menus, antique stoves (look for the sculptural 1924 Hotpoint Automatic Range), counter appliances, advertisements, photographs, waitressing uniforms, and tin molds. "The purpose of the museum is to interpret food culture for the community here at the university," Gutman explains. "We have thousands of young people going into the food industry and we are here to show them where things have come from, what's going on now, and inspire them to change the world on a plate."

His own research specialty is American diners. One of several permanent displays, *Diners: Still Cookin' in the 21st Century,* features thick blue-plate dishware, archival photos of short-order chefs, an interactive kitchen for kids, and the original neon sign from a beloved 1930s icon: Moody's Diner on Route 1 in Maine. Also open for faux business is the Ever Ready Diner, a restored 1926 Worcester Lunch Car last used in Providence, before being donated to the museum. "The diner was born in Rhode Island," Gutman says, "and is an institution that has been constantly rediscovered by new generations tired of fast food, which is all the same, and those looking for a little personality."

Visitors can also check out exquisite boxes made from chocolate with decorations looking like spun lace (made by Johnson and Wales students) and a series on wedding cakes. *Food on the Move* features TWA's china from the "Ambassador's Service" (first-class) dining set along with an original 1965 blue-green stewardess uniform and matching beret, chimes that called travelers to dinner on rail trips, and a TraCo aluminum tray used by carhops at drive-ins, which "revolutionized the eating habits of countless Americans, moving food service from the table to the car." Gutman is planning to expand the *Dinner at the White House* exhibit with new donations from the Kennedy-era chef. For now, one can see Patricia Nixon showing off a gingerbread house, along with a menu from Abraham Lincoln's second inaugural ball (among the delicacies was terrapin stew). "In the rush to partake of all the wonderful confections, meat dishes, and calf's foot jelly, creams, and aspics, a lot of it ended up on the floor," reports Gutman. "People treated it like a frat party. President and Mrs. Lincoln did come in but they didn't stay long. The other revelers partied on until 4 A.M."

Waterworks Museum

Boston (Chestnut Hill) | 617-277-0065
www.waterworksmuseum.org

As BOSTON'S POPULATION soared in the latter part of the 1800s it became clear that more and higher-quality water would be essential to keep the public healthy and hydrated. Seven major reservoirs were constructed, along with aqueducts that would fill the new Chestnut Hill Reservoir, which doubled as a popular city park. With that expansion came a neo-Romanesque pumping station, in 1887, that soon housed state-of-the-art, steam-powered engines.

The station, designed by H.H. Richardson protégé Arthur Vinal, and its massive marvels of mechanical engineering were finally opened to visitors last year after standing neglected for decades. "Waterworks," explains executive director Beryl Rosenthal, "represent a high point in history where you had the confluence of architecture, science, and industry, along with a growing awareness of health issues and germ theory." The pumping station was the first in the country to have an affiliated lab, founded by biologist George Whipple, that tested for contaminants.

The sandstone and granite station is worth visiting for its craftsmanship alone. Unusual masonry details abound and inside, a cathedral-like ceiling in the Great Engines Hall is composed of patterned pine bead board, along with three elegant brick arches and ornate interior moldings. The three engines, built in 1895, 1898, and 1916, respectively, are equally stunning, with their spiral staircases, giant valves, and artful design. "There is a sense of awe and mystery when you walk in and see the scale of these machines," says Eric Peterson, A.L.M. '11, director of operations. The museum explains the cultural and practical history of water use as well as the machines' precise mechanics. Animated, three-dimensional renderings pull apart the inner workings to reveal how these engines, at their peak, pumped 100 million gallons of water a day to the city's highest elevations.

The last of the three, the Worthington-

Waterworks Museum


Snow horizontal cross-compound engine, ran until the station was shut down in the mid 1970s, when the pressure aqueduct system was expanded and refined. A hard-won, grassroots effort saved the property from "re-adaption" by a developer (who did build adjacent condominiums), "because this was the nexus of the entire water supply for the Greater Boston area," says Rosenthal. "It all flowed through here."

New Britain Museum of American Art

New Britain, Conn. | 860-229-0257
www.nbmaa.org

Located 12 miles from Hartford, this vibrant museum features both a heralded permanent collection (e.g., the five-panel 1932 mural, *The Arts of Life in America*, by Thomas Hart Benton, and multiple works by the Connecticut-raised Sol LeWitt) and an exciting rotation of works by contemporary artists. It is also a major community resource for lectures, classes, concerts—and popular, art-themed parties. "The bread and butter of our mission is to have programs for a variety of ages at different levels of art appreciation," says director Douglas Hyland. "We have 42 percent visitor participation in programs, which means they are not just walking around looking at art, they are taking classes and coming to films and other events."

Hyland is adept at mixing and matching a dynamic display of old and new, traditional and provocative. Colonial portraiture, works from the Hudson River and Ashcan schools, as well as those of abstract artists like Milton Avery, are thoughtfully organized and rotated from the museum's more than 11,000-piece collection, in which Winslow Homer, Mary Cassatt, Thomas Eakins, and Childe Hassam are represented.

The lush landscapes of New England artist Nelson H. White capture the day's changing light along regional shorelines and marshlands (through October 14), and in the front courtyard (through November) stands a thoroughly contemporary, interactive piece called *Particular Heights 2.0.* Visitors can use a swing set that counts the accumulated swings while taking webcam stills of the users; the images are then fed into a gallery inside the museum. Artists Paul Theriault and Siebren Versteeg are exploring the process and meaning of constructed, recycling imagery and human action in the digital age.

Also on display are pieces from the museum's unique collection of 1,782 American illustrations, largely gathered by its first director, Sanford B.D. Low, who, Hyland says, presciently saw their worth. Low's


New Britain Museum of American Art

friend Norman Rockwell personally donated the drawing *Weighing In* in 1969: the first of his illustrations to be housed in any museum. Complementing those, through December 9, is *Pixelated: The Art of Digital Illustrations*, which showcases some of the brightest current artists in the genre.

Since its founding in 1903, the museum has survived dramatic changes in its home base. Once known as the "hardware city" for its powerful concentration of manufacturers, New Britain now boasts chiefly Stanley Black & Decker (formerly Stanley Works), which is and has been a major corporate underwriter for the museum since it opened. "The industrialists who helped found the museum [its parent institute was chartered in 1853] saw an influx of immigrants coming into the city to work in the factories," Hyland explains. The museum and its adjacent Walnut Hill Park, designed by Frederick Law Olmsted, were created, he adds, with "the idea that people here would have recreation and sports and also an art museum that would feed their minds and souls, and give people who had just come here from foreign countries an idea of the American experience." Here, that mission is still being accomplished.

Lake Champlain Maritime Museum

(April through October)
Vergennes, Vt. | 802-475-2022
http://www.lcmm.org

From 1996 to 2006, the dive team of the Lake Champlain Maritime Museum painstakingly searched the watery depths of this 120-mile-long boundary between Vermont and New York State. They found more than 300 shipwrecks, ranging from eighteenth-century gunboats to pieces of steamboats and canal schooners, as well as other "cultural remains" like railroad trestles, two airplanes, and even a horse-drawn sleigh. Artifacts from the wrecks, along with other pieces of nautical history, are gathered at this sprawling shoreline museum to tell the fascinating story of who lived, fought, and did business in the region. "Throughout history, the lake has played a large role in opening up a corridor for trade and travel between the Great Lakes and the central United States and from New York City into Canada," notes Eloise Beil,


Lake Champlain Maritime Museum

the museum's director of collections and exhibits. Nine of the shipwrecks are designated underwater historic preserves. The museum hosts above-water boat tours in which visitors see what's below through robots armed with cameras.

The museum also explains the lake's role in several wars. Benedict Arnold fought British vessels using 15 gunboats on the lake, one of which, *Philadelphia*, was salvaged in 1935 and is on display at the Smithsonian's National Museum of American History. The Maritime Museum has produced a full-sized, working replica, *Philadelphia II*, that can be boarded daily and serves as the centerpiece for annual reenactments of eighteenth- and nineteenth-century military and naval activities. Next summer a flotilla of replica sailing and rowing boats crewed by reenactors will dramatize the defense of Lake Champlain during the War of 1812.

A nautical archaeology research and conservation lab is open to the public, as are various exhibits on vintage outboard motors, a beautiful collection of wooden boats, a display about early relations between Europeans and indigenous peoples, and a comprehensive exploration of the canal-boat era (c. 1820-1940) that features the museum's working replica, *Lois McClure* (which tours regional ports). Artifacts include possessions of a family that escaped an 1876 schooner wrecked during a storm: a china doll, a toy ship model, tools, dishes, a shoe, and a piece of a stove. Such are the depths of history revealed.

The Willard House and Clock Museum

North Grafton, Mass | 508-839-3500
www.willardhouse.org

This house museum is dedicated to the Willard family of clockmakers, whose pioneering horological technology and insistence on elite craftsmanship helped set them apart from other regional clockmakers for about a century, starting in 1766. Some 80 clocks are on display, primarily made by four brothers who were born and raised in the home: Benjamin, Ephraim, Aaron, and Simon. (Simon, considered the best clockmaker, cared for Harvard's timepieces for 50 years; his 1829 banjo clock, named for its shape, still keeps time for the Faculty of Arts and Sciences.) "Simon and his brothers helped forward the technology of clocks, which made timekeeping much more accessible," says museum director Patrick Keenan. "Before they invented the eight-day, weight-driven banjo clock in 1802, all clocks were 30-hour clocks, which meant they had to be wound every day instead of once a week." Timekeeping was a key aspect of keeping schedules and working outside the home in an increasingly industrialized society.

The clocks, all weight-driven by pendulums, came in three types: tall case clocks, or Roxbury-style; highly decorative shelf clocks; and the gallery/banjo clock. Also famous is the Willard cylindrical "Lighthouse Clock," among the first to have a built-in alarm. One example, adorned with a cameo of the Marquis de Lafayette, sits in the White House library. Willard clocks were much sought after. In 1801, Simon made a large gallery clock for the U.S. Senate that was destroyed when the British burned Washington. Through that job he became friends with Thomas Jefferson, who later hired him to make a clock for the University of Virginia (which also later burned). His clocks also hung in the U.S. Capitol and in what was then (1837) the U.S. Supreme Court chamber.

The Willards created the clocks' inner workings while the dials, cabinets (often mahogany), and decorative details, such as gilding or miniature landscapes, were farmed out to other artisans. "All of the pieces are a marriage of technology and art," Keenan says. It took three to six weeks to make a mechanism from scratch and as many as nine months to finish one clock. "All the ones here are still running after 200 years," he adds. "You just don't find that kind of care in making things anymore."

Hancock Shaker Village

(April through October)
Pittsfield, Mass. | 413-443-0188
www.hancockshakervillage.org

Although the Shakers occupied a relatively small slice of American history, their religious utopian vision and artistic legacy have endured—even thrived. The Hancock Shaker Village, built and occupied by Shakers from 1780s until 1960, offers one of the best opportunities to delve into their way of life. Eighteen buildings, including the beautiful 1862 Round Stone Barn, along with artifacts—from their signature slender-legged furniture and tools to handmade clothing and household objects, such as the elegant oval wooden boxes—are all on display. (The museum has more than 22,000 objects, among the largest Shaker collections in the world. Also worth touring are the Shaker

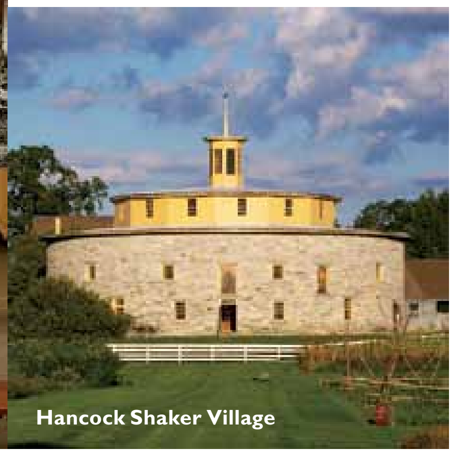
museums in Canterbury and Enfield, New Hampshire.)

At Hancock, visitors can stroll the village, meeting interpreters—some in costume—engaged in Shaker activities such as blacksmithing, quilting, and woodworking. "We also have a working, community-supported farm, so visitors can talk with people in the gardens and who work with the animals," says marketing director Laura Wolf.

The Shakers' commitment to gender equality is explored and depicted in their dormitory sleeping arrangements: each hall housed men and women in rooms on respective sides, rather than on separate floors, for example. Visitors can also sit in a meetinghouse where Shakers worshipped and learn about their beliefs at different stages. "One height of their spiritualism was a period in the mid 1800s they call the 'Era of Manifestation,'" Wolf explains, "when they received spiritual gifts during worship or meditation, such as new artwork, songs, poems, and messages about how the community should interact with one another." To learn more and celebrate the Shaker tradition at harvest time, attend the village's annual country fair on September 29 and 30.

HM

Visit harvardmag.com/extras to view additional images of New England museums.



Hancock Shaker Village

Bitter, Sweet, Salty—Yum

West Bridge's French-New England fare is fun.


PHOTOGRAPH COURTESY OF WEST BRIDGE

West Bridge has an appealing industrial-cum-farmhouse feel.

Housed in a lofty, industrial-styled space, West Bridge is both mod *and* vibrant, "cool" and warm. Diners of all kinds, from date-nighters and post-work partyers to the more sedate crowd, can find a spot to suit their needs at this thoughtfully composed restaurant.

We sat outside on the expansive concrete deck, overlooking a large brick courtyard. West Bridge (the old name of the nearby Longfellow Bridge to Boston) is across from The Blue Room and the Cambridge Brewing Company, and a quick walk from the Kendall Square Cinema. Watching the sunset, we sipped a dry *garnacha blanca* wine (there is also prosecco on tap!) and crunched warm bread smeared with homemade butter. A Dylan-esque musician played across the way, his voice mingling with the chattering thrum of other diners: all unobtrusive, and somehow calming.

The meticulous design of West Bridge extends to the food. Co-owner and chef Matthew Gaudet (formerly of Aquitaine in Boston) makes delicious music by juxtaposing bitter, acidic, or even metallic flavors against sweet, creamy, or salty foods, letting each sing individually, while remaining mindful of how they play in concert with other ingredients on the plate.

The dandelion salad ($11) was dressed in a grapefruit vinaigrette. On paper, that seems all too sharp. But the bitter bite and juicy sourness went well with the soft, buttery duck confit accompaniment, each and all accented by dots of sweet gooseberries and the tickly texture of earthy ramps (we wished there had been more of those). New England-style "chowdah" ($11) took a delicate nutty twist with sunchokes as its base. The soup was enhanced by Wellfleet clams, served in their shells with tender cubed potatoes and a generous smattering of smoked pork shoulder. Each flavor—nutty, briny, doughy, and salty—was distinct, the seaside treats not lost in bland dairy goo. Even the potatoes tasted fresh-picked.

Gaudet did it again with the unusual lobster terrine ($13). A slab of coral-toned gelatin (everything served is visually stunning) held sweet hunks of lobster topped with fine bits of rye cracker, a tasty combination of sea-depth richness with a salty, almost sour crunch. The swirl of Pernod aioli injected with black squid ink added a creamy and dramatic flair. The duck-breast entrée ($25) looked like an abstract painting: the tender fowl was placed amid shards of orange (carrots) and white (parsnips) strewn with a dark hibiscus-beet vinaigrette, all offset by a cloud of black rice, cooked almost like a saucy risotto.

Just as bold, in color and flavor, was the vivid orange char ($25), plated on intertwined lacings of a verdant basil grapefruit jam and an elegant parsnip purée, alongside a few braised artichoke hearts that lent some brawn. The fish was perfectly cooked and topped with sliced raw almonds, which had a grassy, "stainless steel" kick.

The desserts followed suit. The dome-shaped carrot cake ($7) was atypical—the cream-cheese filling was hidden inside—and flanked by a rich, raw carrot-juice sauce (not sugary) and a light, highly sieved applesauce. Flecks of dried carrot topped the cake, adding a splendid crunch. We also loved the two rich, sweet, crumbly, gooey chocolate cookies sandwiching Mexican chocolate ice cream—a sharp, minty jalapeño flavor—and immersed in a glossy *ganache* ($7).

Gaudet's playful combinations give every dish its own complex dynamics. West Bridge is, thankfully, no copycat European bistro. Here there is a sense of the importance of creativity in cooking and a push to enlighten a perhaps softer-palated public. ~N.P.B.

WEST BRIDGE
One Kendall Square, Cambridge
617-945-0221
www.westbridgerestaurant.com

Can America Compete?

Strategies for economic revival

Does the United States face insoluble economic challenges? In the aftermath of the 2008 financial crisis and subsequent recession, growth has been sluggish—with unemployment devastating far too many Americans. Yet the real problem, obscured by this acute, cyclical downturn, may be a long-term erosion of competitiveness in a more challenging global economic era.

For a third of a century after World War II, U.S. economic prowess was unquestioned. But as other nations prospered, America's status came to seem less certain. That changing *relative* position attracted the interest of Harvard Business School (HBS) scholars. The school's U.S. Competitiveness Project (www.hbs.edu/competitiveness), launched last spring, draws together expertise from colleagues and from other institutions, under the leadership of two members of HBS's strategy unit: Lawrence University Professor Michael E. Porter, the leading scholar of competitive strategy (identifying the elements that can make an enterprise distinctive and successful, sorting out the defining characteristics of different industries, advising nations about their economic opportunities); and Rauner professor of business administration Jan W. Rivkin. Their collective aim is devising strategies for a robust U.S. economic future.

The work proceeds from an encompassing definition of the purpose of business and economic activity: *The United States is a competitive location to the extent that companies operating in the U.S. are able to compete successfully in the global economy while supporting high and rising living standards for the average American. A competitive location produces prosperity for both companies and citizens.*

The project's research attempts to address comprehensively the country's economic strengths (innovation and entrepreneurship, for instance, and research universities) and shortcomings (deteriorating worker skills, complex tax and regulatory systems, and fractious federal policymaking). A survey of HBS alumni added weight to those concerns—particularly about political paralysis and the relative attractiveness of other countries for future investment. A special issue of *Harvard Business Review* presented a baker's dozen of in-depth analyses of major issues by project participants, from reforming finance to investing in green energy to righting the federal fisc (in part by raising revenue with carbon and value-added taxes). Among the noteworthy themes emerging from the work:

• The importance of the business "ecosystem." Individual firms' decisions depend on the network of resources (diverse suppliers, skilled workers, efficient infrastructure) around them. Focusing on a single enterprise may be insufficient to assure success—and may even undercut it, if a firm's short-term, self-interested decisions starve the "commons," compromising future prosperity.

• Acting locally. Those attributes for economic success, and the policy context for a firm's operation, are effective and can be affected *locally*, where the availability of workers, training, academic and educational expertise, and other factors determine what companies and industries can actually do. A region's business, labor, education, and government leaders can do much to enhance competitiveness *without* awaiting federal action (although much depends on what happens in Washington, too).

• Improve, not move. There is ample room for better practices *within* businesses' control. One is making decisions about where to locate (or to outsource) operations in a more sophisticated, nuanced way. Another is investing in apprenticeships and other skills programs for workers. A third is rethinking stock-based compensation systems, to rein in powerful incentives toward short-term thinking and excessive risk-taking by business managers and institutional investors alike.

The competitiveness agenda is daunting. Tweaking this regulation, refining that tax credit—these are not even half-measures. Yet the broad analyses and recommendations have the ring of reality, and suggest common gains for companies, citizens, and their communities. On balance, Porter, Rivkin, and their peers remain encouraged about America's prospects, based on its enduring strengths and proven economic adaptability. McLean professor of business administration David A. Moss even finds in historic ideological divisions and partisanship the seeds for future compromises and progress that might ease business leaders' greatest current fear about the country's economic future.

Harvard Magazine recently met with several of the competitiveness project's principals, from diverse business disciplines, to discuss their research at length. Edited versions of those conversations follow. *—The Editors*

Through October 31, *Harvard Magazine* readers can access the *Harvard Business Review* articles detailing the research discussed here, free of charge, at http://hbr.org/archive-toc/BR1203.

Portraits by Stu Rosner

The Strategic Context

"We should have been worried before the Great Recession."

Michael E. Porter, Lawrence University Professor, and Jan W. Rivkin, Rauner professor of business administration and head of HBS's strategy unit

Harvard Magazine: *What prompted you to begin this inquiry?*

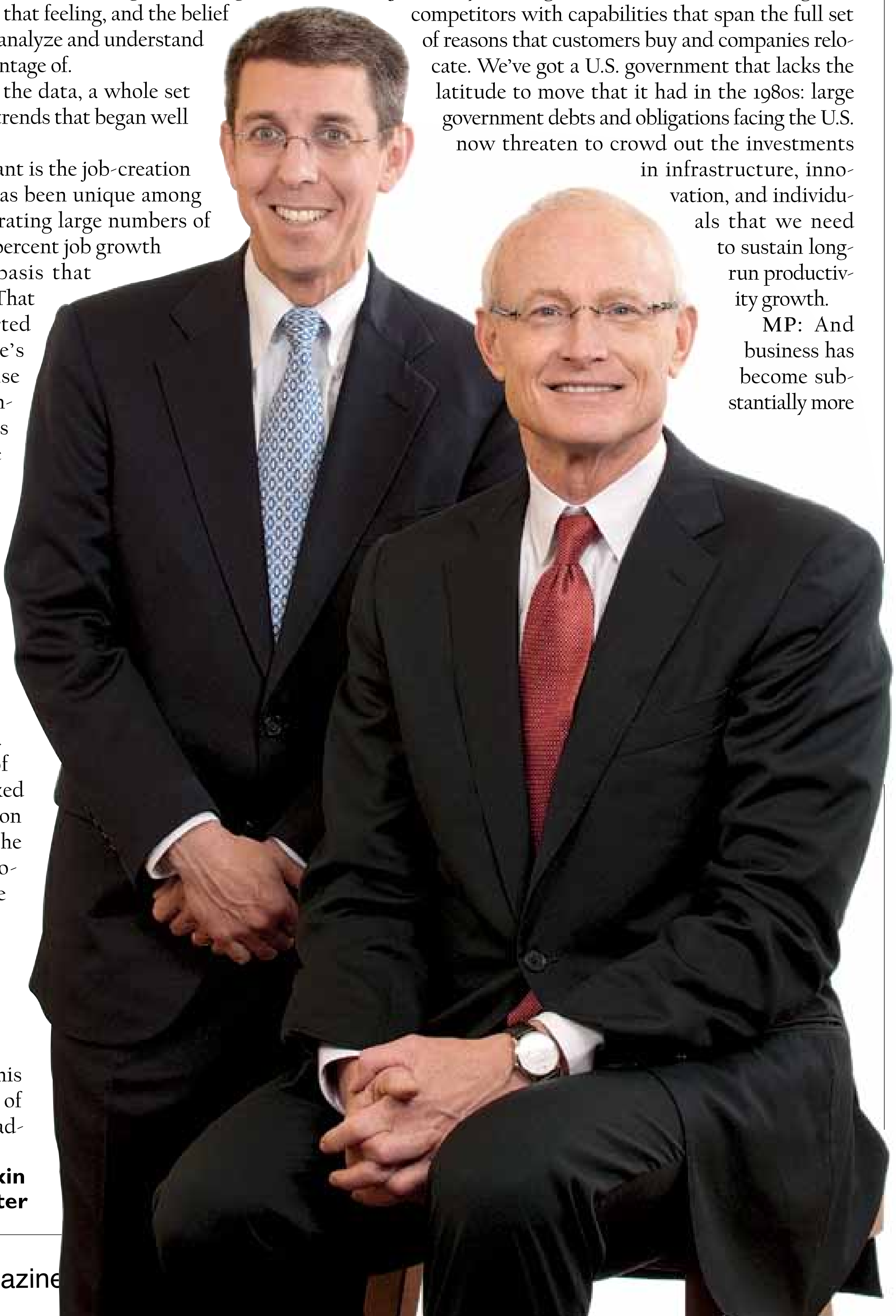
Michael Porter: There was a clear feeling at HBS that something different was happening in the U.S. economy—this was not just a deep recession caused by the housing mortgage crisis and so forth. The recession is very real, but something more was going on. This project was born from that feeling, and the belief that the school could convene and analyze and understand in ways we had not taken full advantage of.

As Jan and I started looking at the data, a whole set of indicators validated disturbing trends that began well before the Great Recession.

Most obvious and most important is the job-creation machine. For decades, America has been unique among large advanced countries in generating large numbers of jobs steadily over time: roughly 2 percent job growth per year [on a rolling 10-year basis that smooths out short-term factors]. That great American job machine started sputtering around 2000. There's something structural here, because it started before the recent downturn. Moreover, we and others discovered that virtually all the net new jobs created over the last decade were in *local* businesses—government, healthcare, retailing—not exposed to international competition. That was a sign that the U.S. was not doing well in businesses that have to compete internationally.

The data also showed what many had known—that wages started stagnating well over a decade ago. The participation of Americans in the workforce peaked in 1997, and workforce participation is critical to prosperity because the more people who work as a proportion of the total working-age population, the higher per capita income will be whatever the wage level. All of this is threatening the American dream, the idea that each generation will be better off than the previous one.

The question was, "Why did this happen?" What were the causes of the problems, and what could leaders do about them?



Jan W. Rivkin and Michael E. Porter

Jan Rivkin: By many current measures, America looks all right *today*: we have an enormously productive economy, high wages in absolute terms in many parts of the economy, a large share of exports and foreign direct investment [FDI]. But when you look at the trajectory over time—job growth rates, wage growth rates, changes in export or FDI share, particularly compared to emerging economies—the country looks much weaker. We should have been worried before the Great Recession.

HM: *In the 1980s, Americans were concerned about the competitive challenge from Japan. Are current challenges different?*

JR: Today, we've got a far more diverse set of global competitors with capabilities that span the full set of reasons that customers buy and companies relocate. We've got a U.S. government that lacks the latitude to move that it had in the 1980s: large government debts and obligations facing the U.S. now threaten to crowd out the investments in infrastructure, innovation, and individuals that we need to sustain long-run productivity growth.

MP: And business has become substantially more global. The typical U.S.-based multinational corporation has a much higher percentage of its total activity outside the U.S. today. Early in our work, we'd talk to business executives and they would say, "I can't just worry about America, I run a global company, we're not an American company anymore." The notion in business that this is *our* country and we own its challenges has diminished.

We believe that that corporate perception is ill-advised. It may be true that more of a company's activity is global, but that doesn't diminish the importance of U.S. vitality to its vitality. The first reaction to globalization was often, "It's wonderful that we can relocate anywhere. If we have a skill shortage here in America, we can just go somewhere else. If we can get a better tax deal there, we'll go there." But that thinking is changing. One of the optimistic findings of this project is the enormous readiness of many in the business community to roll up their sleeves and do things in their communities and companies to make America more competitive.

JR: An important notion is what we call the "business commons" from which companies draw: a skilled workforce, an educated populace, vibrant local suppliers, basic rule of law, and so on. Historically, American businesses invested in these resources deeply, and that helped to build many of America's strengths.

Then, in a world of increasing geographic mobility, many businesses took that commons for granted in America. Interestingly, they actually invested in building the commons elsewhere because they realized its importance—but in the process, over a number of decades, the commons got run down in America. The good news is, we see a large number of business leaders who recognize the importance of reinvesting at this point.

HM: *In this context, you advance an unusual definition of competitiveness. Is that really the fulcrum for your whole project?*

JR: We define U.S. competitiveness as the ability of firms in the U.S. to succeed in the global marketplace while raising the living standards of the average American.

The second part of that definition is immensely important. Sometimes you hear people saying the U.S. would be more competitive if only wages were lower or we had a cheaper dollar. But if we took a national pay cut in that fashion, we'd hardly applaud it as a great success of U.S. competitiveness. To the contrary, that's an indicator that we have to choose between being able to sell our products to customers and paying our citizens well.

A competitive economy does *both*. The only way you can do both is by satisfying customers, shareholders, *and* employees. You can do that only by raising productivity—being better at changing inputs into valuable outputs than the other guys. So the ultimate goal of national policy has to be long-term productivity growth.

That may sound obvious, but the rhetoric these days is all about jobs, jobs, jobs. It's easy to understand why: if you lack a job, it *is* all about jobs. But if you set out simply to create jobs for their own sake, you wind up investing in areas not where you're productive, but where you can create a lot of jobs quickly. Yes, we absolutely want jobs. But we want competitive jobs that can last in a demanding global economy.

MP: The sectors where you can generate the most jobs quickly tend to be in things like healthcare and construction—inherently local activities. But any economy is an interesting combination of what we call "traded businesses"—like manufacturing, sophisticated services, and tourism that are exposed to international competition—and local ones. For any large population there are a lot of local needs—food, housing, utilities—but ultimately the vitality of an economy is heavily determined by the traded part. That's where we find the opportunities for much higher productivity that can support high wages. You want to grow those areas where you can be highly productive and serve the *world* market. Where you can't be productive, you need to import. You want local needs to be met efficiently, but the ultimate wealth that feeds the local economy derives heavily from the traded economy.

Therefore, the U.S. economy's inability to generate net new jobs in the traded sector for the last decade is deeply disturbing. Also, the ability to raise wages, particularly in the traded sector, is being capped by the enormous improvements going on in other countries. It used to be that the wages of U.S. workers rose in line with domestic productivity, but the two became decoupled. Some attribute that to declining unionization. That may be part of it, but much has to do with the fact that employers can hire an equally skilled person in another location at a lower wage. Other countries have been improving their game with good skills compared to us and have better infrastructure in some cases than we do.

We believe the U.S. retains its core strengths, but we have allowed ourselves to fail to progress rapidly enough to continue to justify our standards of living, at least during the recent decade.

JR: The things America is great at—higher education and entrepreneurial capacity and scientific and technical infrastructure—are very hard to replicate. The things that we're bad at now are largely the results of choices we made.

HM: *The U.S. today seems to have trouble focusing on major policies in pursuit of overarching goals such as enhanced productivity. What does it mean for businesses and the government—in their own spheres and together—to be strategic and comprehensive in pursuit of making the U.S. competitive again?*

MP: The challenge of the whole issue of competitiveness and productivity is that it's influenced by a vast array of factors: schools, roads, regulatory complexity, almost everything matters—not just the traditional macroeconomic policies. If you don't have a good public-education system, for example, you lack the foundation for productivity. If you don't have people who are healthy and can afford good healthcare, you lack that foundation. If you don't have a governmental system that works effectively and delivers good public services, that's a drag on productivity.

The United States used to be a uniquely productive place to do business, and not only for entrepreneurship where we still have strengths. For example, we used to have amazingly efficient logistics. Because we've been so committed to open competition, we

The notion in business that this is *our* country and we own its challenges has diminished. We believe that that corporate perception is ill-advised.

tended to have efficient producers and distributors throughout the economy. A lot of other countries were saddled with special interests and monopolies. We've been able to preserve the long-term strengths Jan just mentioned—we stay ahead in those areas.

But ironically, we've lost out on some things that seem more basic. For instance, do we have a regulatory environment that makes it easy to conduct business? The World Bank's "Doing Business" report ranks every country on the ease of doing business. Twenty years ago, the U.S. would have been by far the easiest place. Now we're well down the list—not in the top 10. In other countries, I've participated in some government-established working groups dedicated to improving their rankings. Lately, the U.S. just hasn't been improving the basics nearly as fast as some other countries.

It's a knotty problem because competitiveness is sort of *everybody's* agenda. That's one reason you have to be strategic: there are so many things to work on that if you don't have a clear sense of priorities and sequencing and a sustained effort, you don't make progress. Our single-issue focus lately works against us.

BLOOMBERG VIA GETTY IMAGES

GE Healthcare employees assemble magnetic-resonance imaging machines in Beijing. In 2011, the highly global company moved its x-ray unit headquarters staff to China—a major, rapidly growing market.

There's also a tremendous mismatch between the time horizons of politics and of competitiveness. Most things that matter for building competitiveness take a decade or *multiple* decades to improve. But we have a political system that's increasingly about today's news. This mismatch has probably gotten worse in the last 10 or 20 years. The politics of economic policy is never easy, but we used to be better at overcoming political differences.

JR: Two elements make building competitiveness vexing. The first, which Mike emphasized, is that there are so many related elements. The second is that the lag times involved are very long. Investments in improving K-12 education have an impact a decade, two decades, from now. That means you need to make sets of choices that are holistic and farsighted—and I think you can argue that in both public policy and on the business side, we have moved toward fragmentation and near-term thinking.

MP: It's particularly hard to pursue the agenda in the United States. This is a very large country, very spread out, very complex, there are 300-million-plus people—so it's just more difficult to think strategically and long term here as opposed to in South Korea or Singapore. China has had the luxury, or curse, of a high degree of centralization that makes long-term thinking much easier.

HM: *One issue that is in businesses' purview is the research you've done on firms' location decisions. Could businesses be doing a better job of that?*

MP: American businesses *should* be locating certain activities abroad because that makes them more competitive by enabling them to better penetrate international markets. In some cases, producing offshore also saves unnecessary costs of shipping goods to distant markets, or allows better adaptation of products to local circumstances. So globalization at one level has *enhanced* the competitiveness of U.S.-based companies and will support their growth in the U.S.

That said, our research revealed that offshoring and constructing global supply chains is really complicated—it is challenging to accurately figure out the total costs of locating in China or another country versus in the U.S. We found that many activities should have gone offshore, but some probably should not. In making their location decisions, some managers failed to understand hidden costs of offshoring, such as indirect costs of hiring and retention, supervision, and intellectual-property protection.

We also identified some trends that are working in favor of the U.S. for location decisions—some for reasons we should be unhappy about. For example, wages are rising much more rapidly in China and India than they are here. We want China's wages to go up—we just would like ours to go up faster, justified by our productivity. Also, the U.S. dollar has depreciated.

Other trends favoring the U.S. are unambiguously good news. For instance, it has become significantly more expensive to move goods, so if you want to tap America's market, the largest single market in the world by a considerable margin, you're more likely to produce here.

And you can add another wild card: the whole energy situation. The U.S. suddenly has a potential surplus of energy through the production of oil and especially natural gas trapped in shale. This development is a potentially transformational asset, and major activities in chemicals and other industries can move back to the U.S. because we now have low-cost energy.

JR: Mike described some issues that make location choices a hard problem for multinational corporations—particularly, hidden costs that don't appear until years in the future. A second difficulty is that there is a tendency to take a static view of the U.S. environment. It's very easy to assume that the state of the business environment here is a given. In fact, businesses can *improve* the environments in which they operate—by investing in the local workforce, by mentoring local suppliers, and so on—but that's hard to include in your calculations correctly.

HM: *You use the vivid phrase "Improve, not move" as a way of describing businesses' options.*

MP: One of the myths about competitiveness is that it is driven mostly by government policy and that the solution to competitive problems is government action. The more we've gotten into this, the more we understand that *business* can influence many of these things that constrain U.S. competitiveness without the president signing a new law. Businesses—both individually and collectively—can make major contributions by enhancing skills, improving the supplier base, and taking other steps.

JR: Just as it's an error to think government is the only solution, it's also an error to think government is exclusively the problem. You can trace some of the weaknesses in the U.S. business environment right back to things that businesses have done in their narrow self-interest. How did we get such an incoherent, complex corporate tax code? Because the IRS wanted loopholes? No, because businesses pleaded for loopholes that benefited them.

MP: And legislators saw a great way to get campaign contributions.

HM: *What reaction have you heard from the business community?*

MP: Very little disagreement on the fundamental diagnosis. Most people feel in their gut that something is going wrong in our economy. When we're in the company of political leaders and public figures, there are often statements of optimism, of not wanting to bet against America—and we share this perspective. We think this is a fixable problem, that the U.S. could make rapid improvements. It's going to take time, but we believe America is eminently capable of renewing its competitiveness.

We are discovering an increasing awareness in the business community: they have a role in American competitiveness. They want to do something constructive and be part of the solution. But one of the things that is different now from 30 years ago is the public perception of and attitude toward business. There's a lot of skepticism, and frankly, some of it is deserved.

JR: I've met very few business leaders who conclude, "There's no problem, and we'll just ride this one out." At the same time, I've met very few who feel the situation is so bad it can't be fixed.

Most people we've talked with feel we've got a real problem, it can be fixed, but it requires action. They're asking about the right steps to take. Even the leaders we see taking action are asking, "What more can we do?" There's a search for better answers.

MP: That said, there's an almost universal view that our federal political system is one of the greatest threats to our economic future—because of its inability to tackle some of these issues. There are some federal policies that a great majority of those in the private sector agree are necessary. They defy labels—they're not Republican or Democratic, not liberal or conservative policies.

Almost everybody agrees we've got to simplify the corporate tax code: statutory rates are too high, the code is riddled with loopholes, deductions need to be reduced. The right policy is to lower the rate substantially and end most deductions. That's a policy economic theory supports, and almost everybody in the private sector agrees with—though some will lose cherished deductions.

The U.S. also has an unusual system of taxing our companies on foreign income, which has led to dozens of companies moving their corporate headquarters offshore and American companies holding more than a trillion dollars of cash abroad rather than repatriate it. Almost all agree that a better system would harmonize U.S. practices with those of other leading countries.

On immigration reform, pretty much everybody agrees we need increased skilled immigration. And there are many other areas like these, yet the U.S. can't seem to make any progress on them.

It's not that we haven't had partisan bickering in the past, but at the end of the day we came together and compromised on key policies for education, infrastructure, and support for science [see the conversation with David Moss, page 40]. America believed in business and entrepreneurship. Today, the political support for business has become very polarized. This is a key reason we're just not making progress on some of the fundamentals.

Manufacturing

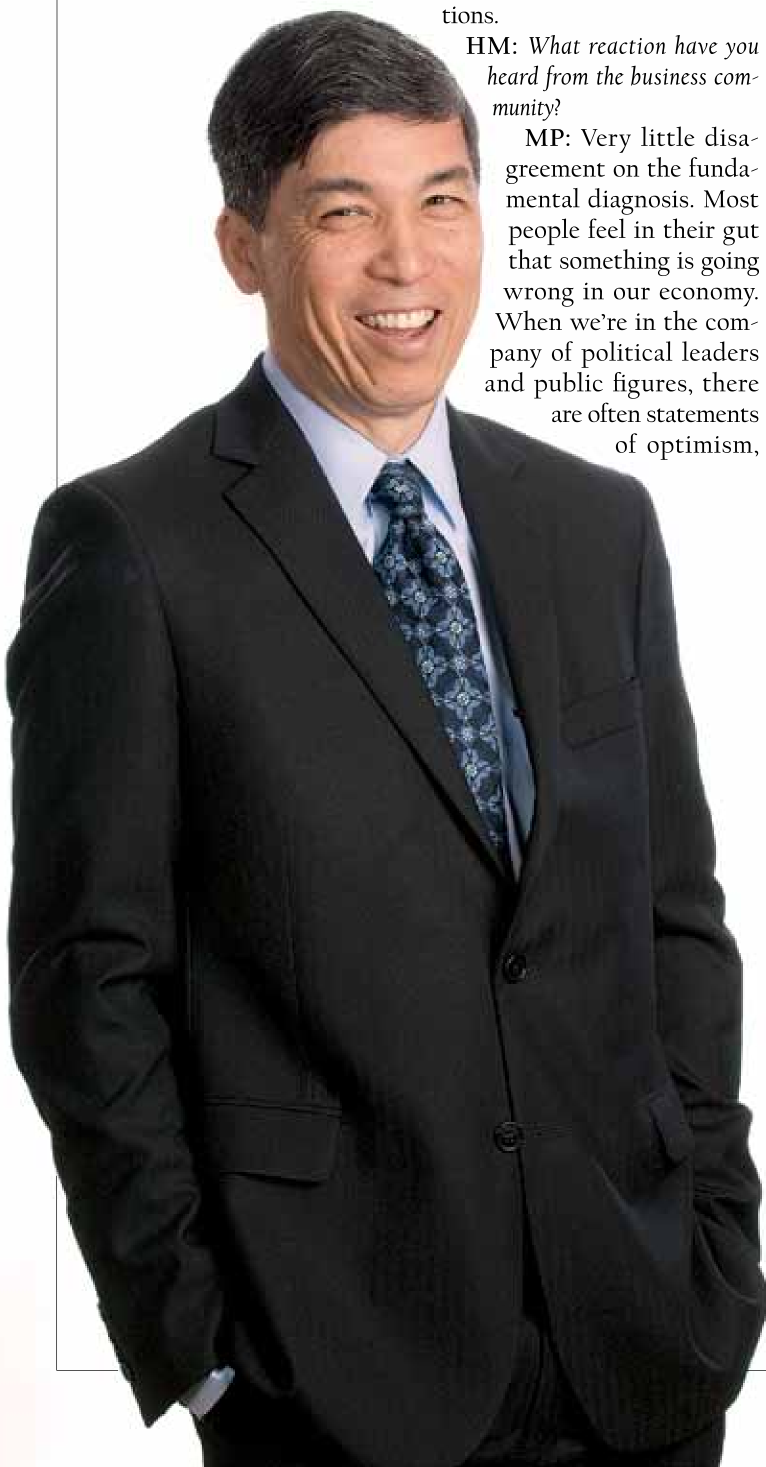
"There was no way for us to get to market in the U.S."

Willy C. Shih, professor of management practice, HBS's technology and operations management unit

Harvard Magazine: *You've had a lot of manufacturing experience.*

Willy Shih: I spent 28 years in industry. I confronted a lot of puzzles there, and I've been looking at them since coming here.

The interesting question relating to competitiveness had to do with my time at Kodak. In 1997, I took over the consumer digital business it was trying to



Willy C. Shih

build. That year Kodak shipped a few tens of thousands of digital cameras. One of the factories in Rochester, New York, had this highly automated assembly line where the engineers were attempting to manufacture digital cameras locally. You needed a whole bunch of electronic and optical components: electronic sensors, the tiny displays that show you your pictures, rechargeable batteries, consumer-electronic stuff.

I found that back in the 1960s and 1970s, all the money in photography was made manufacturing film. So Kodak let go of camera manufacturing except for the low-end, single-use cameras—basically just a box for film with a lens. In the same decades, U.S. consumer-electronics makers outsourced the assembly of TV sets to Asia, and then they gradually let go of more and more of the business.

So I arrive in Rochester and find that there is no more expertise in the U.S. for all the components you need to build a digital camera—not in LCD displays, electronic sensors, zoom lenses, or the tiny electric motors you need to drive zooms. There weren't people who made shutter buttons or view finders, or *any* of those components. So even though my team had decided we were going to be highly automated, you couldn't design and make digital cameras in the U.S. That was the first object lesson.

That was repeated when I took over the organic LED (OLED) business. Kodak made the pioneering invention in organic electroluminescence. In solar photovoltaic cells, it's light in, electricity out; this is electricity in, light out. There are a lot of benefits to this technology; a Samsung Galaxy S smartphone has an OLED display. But the path to market required the ability to make extremely uniform, low-temperature polysilicon on glass. It was the same story: even though U.S. companies *invented* a lot of the technologies, they had given up on *commercializing* and manufacturing them, so there was no way for us to get to market in the U.S.

That led to my thinking about the similarity to the tragedy of the commons—the loss of the shared pastures in a town that nurtured all the farmers' animals. All these predecessor organizations had let these capabilities go because they didn't matter to them individually at the time—but they turned out to be critical if you wanted to go into some important *new* technologies. It raised the question: if you don't have capabilities in some of these areas, does that mean it no longer makes sense to invest in research and development and innovation in other new areas? Gary Pisano [Figgie professor of business administration] and I pointed out in a 2009 *Harvard Business Review* article that you couldn't make an Amazon Kindle in the U.S. because many key capabilities no longer existed. The key technology in that device came out of MIT: the electrophoretic beads for its e-paper display. It was commercialized by E Ink here in Cambridge. But they had to go to Asia to make the complete screen.*

*See Pisano and Shih's new book, *Producing Prosperity: Why America Needs a Manufacturing Renaissance* (Harvard Business Press), for a fuller discussion of these issues.

Part of the problem is that people don't think of manufacturing as *knowledge work.* But a lot of value in commercialization and advanced manufacturing is sophisticated knowledge work.

HM: *What caused this dispersal of manufacturing?*

WS: When I grew up in industry in the 1980s, the thing they always pounded into an engineer's head was the importance of product development and commercialization being close to production. When I was at IBM in Austin, our factory was across the road; when your processes are not particularly mature, it really makes sense to be close to production.

So why did everyone start outsourcing? When the Asian economy—specifically China—opened up, the labor-cost differential was so great and there was such a limitless supply, seemingly everybody focused on labor arbitrage. My fully loaded labor cost in Rochester in the late 1990s was more than 100 times higher than China's. Everybody just moved their manufacturing over there.

Now what happens if your engineers and designers have to be close to manufacturing? Well, we just fill the sky with planes. If you're on the product side of Apple, you spend a lot of time in China—near the factories, working out problems.

The core question is whether this affects your ability to innovate. Gary and I think there *is* an impact, especially in leading-edge technologies where manufacturing processes are not yet mature. So we've just called that out.

Part of the problem is that people don't think of manufacturing as *knowledge work*. They think of it as someone putting in four screws 2,400 times a day—and there is a lot of that in the more mature assembly areas. But in a lot of manufacturing, a lot of value is created in commercialization and advanced manufacturing; a lot of *that* is sophisticated knowledge work. If you wander around in factories around the world (since the beginning of 2011 I've been in more than a hundred factories), you see some very sophisticated knowledge work. In some of the advanced semiconductor fabrication lines in Asia, you have masters in engineering running production tools that cost as much as an airplane—$65 million, $70 million. They're extremely sophisticated and complex, and a lot of engineering goes on *on* the factory floor.

So one of the things we call out is that conception that manufacturing is not knowledge work. For some types of manufacturing, it is very important to maintain production capability because it's tied to your ability to innovate.

HM: *Do you see a similar fate for some of the new industries American businesses have been counting on?*

WS: Photovoltaic panels are a problem because America has let go of a lot of the electronic supply chain and silicon-processing skills from semiconductors. The companies that manufactured semiconductors—that commons fed the flat-panel-display industry, the solar-panel industry, the energy-efficient lighting industry with LEDs, because a lot of the same capabilities flowed into those.

HM: *What about areas of U.S. strength like aerospace assembly, biotech, and medical devices—what are the risks there?*

WS: The same kinds of things. A couple of factors led to unquestioned U.S. manufacturing leadership at the end of the 1960s and early 1970s. We had institutional foundations and broad education in the practical arts, going back to the Morrill Land Grant Act. We controlled mass manufacturing going back to the nineteenth-century "American system of manufactures," with interchangeable parts and gages, specialized tools, sequential production—all leading to Henry Ford and mass assembly of automobiles. And at the end of World War II, all our competitors were in ruins. At the end of that war, we had this public perception that science had won the war—not just the atomic bomb, but things like radar, antibiotics, the proximity fuse, and countless other innovations. So as a country we had a lot of faith in science, and we invested heavily in our basic science and education.

The twin crises of modern American capitalism—rising income inequality and repeated governance crises (including the financial crisis)—can be traced in part to the proliferation of these high-powered incentive contracts.

But other countries did, too—Germany and Europe, but also Japan, the Asian tigers, and China. Now other countries compete very aggressively for those manufacturing facilities. Singapore would love to be the biotech hub of the world: they are competing very aggressively for R&D and manufacturing facilities. Every other Asian country is asking those questions as well: how do I capture more of these export-earning industries?

We haven't thought about preserving those types of capabilities. There are some industries where we're still pretty strong, like aerospace, especially jet engines—the engine manufacturers are pretty thoughtful about what is important to hold on to. But lots of other countries have decided what's important. In the capital-equipment businesses these days, if you're going to sell in a lot of countries, you need to provide production offsets for local manufacturers—so they begin picking up the skills and learn how to move to higher value-added.

I worry about composite materials, where the U.S. has really had a lead. We're shipping a lot of that overseas. I worry about biotech manufacturing and medical devices, where we have a lot of regulatory issues—Europe is a lot easier for medical devices, so we're chasing a lot of the companies that make them offshore.

It's a complex mix of factors, but again the key in my mind is preserving innovative capability. We talk about innovation a lot, but we don't recognize how important *making things* is to preserving some of that innovative capability over time.

HM: *What are the relative responsibilities of businesses and of policymakers in preserving those innovative capabilities?*

WS: Managers need to think longer term about those capabilities and about the context in which they're embedded. It's not only the people and knowledge within their walls—it's their supplier network and competitors in adjacent industries. Thinking about capabilities is key.

The government has to correct some of the policy deficits that caused the U.S. to be less favored as a location. Mike and Jan's survey of HBS alumni showed how few companies would actually choose to locate in the U.S. In some industries, location decisions are heavily influenced by tax incentives. But I can absolutely say that our complex tax law and relatively high rates of taxation motivate people to move operations offshore. So the government needs to think about how we at least get to a level playing field *and* it has the responsibility to invest in public goods: basic scientific research, education, and infrastructure—key parts of the "commons" that private companies are incapable of investing in.

HM: *What skills would the U.S. need to promote to tilt decisions about where to locate operations away from a strictly financial calculation about the cost of hiring suitable employees?*

WS: Once you allow those skills to dissipate, throw away those capabilities, a lot of those decisions are very expensive or impossible to reverse. My counsel is to be more thoughtful about that.

I just wrote a case on a large multinational that has its engineering center in India, with thousands of engineers and an average age of 27, and its home engineering operation in the U.S., where the average age is 47. The guys in India said the U.S. operations hadn't hired anybody in the past half-dozen years, so they don't have fresh skills. Do you retrain, or start with the younger generation and try to keep their skills fresh? That's a huge problem. I saw people at Kodak in film manufacturing who had amazing skills, but as technological substitution happens, those people can't take their skills anywhere.

The global market for tradable goods decimated the lower-skilled jobs. I think it's starting to attack highly skilled jobs, too. I don't have good answers, but I think that's the next huge issue.

Compensation Practices and Incentives

"The first step is popping the myth that we can use financial markets naively to measure performance over short horizons…"
Mihir A. Desai, Mizuho Financial Group professor of finance and professor of law, and HBS's senior associate dean for planning and university affairs

Harvard Magazine: *The crux of your argument is that governance has broken down on both sides of American capitalism: the managers who run companies, and the institutional investors who in effect own them. Monitoring performance, evaluating it, and holding performance to a standard has fallen short. In what ways, and with what consequences for Americans?*

Mihir Desai: The competitiveness of the U.S. economy is connected fundamentally to the productivity of American workers.

That productivity hinges on the allocation of all kinds of capital: financial capital, real capital, and human capital, because workers are most productive with the appropriate allocation of capital. That led me to question how those allocation processes are working and the incentives facing managers and investors.

I was struck by how the evaluation and compensation of managers and investors have been transformed over the last several decades: in short, we have decided to outsource that evaluation and compensation to financial markets. If financial markets indicate that these actors have created value, these contracts suggest that they should take a piece of that incremental value. This seems fair and has become a dominant belief on both sides of the capital market. These beliefs are manifest in the rise of equity-based compensation for managers but also in the rise of the alternative-asset industry that relies on a similar logic. Indeed, the rise of the alternative-asset industry—both hedge funds and private-equity firms—has been transformational for global capital markets, and they are predicated in part on this intuition.

I label the evolution of these practices a "financial incentive bubble" because I think they are unsustainable as implemented. As I lay out in my *Harvard Business Review* article, I think the twin crises of modern American capitalism—rising income inequality and repeated governance crises (including the financial crisis)—can be traced in part to the proliferation of these very high-powered incentive contracts for managers and institutional investors.

HM: *Years ago, there was concern that corporate managers did not have the same interests as shareholders, so there was a reformist impulse: give managers stock as an incentive and everyone's interests would be aligned. You're saying that reform was too simplistic?*

MD: The impulse for such reforms was correct: well-designed instruments can provide for an alignment of interest between shareholders and managers. But *implementation* of those ideas has become far divorced from that abstraction. In particular, these contracts for managers and investors have made little effort to control for *relative* performance or for the risks undertaken—and have been implemented over time horizons that are simply too short.

For example, *un*-indexed performance contracts—that award corporate managers stock compensation but don't try to control for some general level of stock-market or industry performance—are dominant in the U.S. and difficult to reconcile with common sense. Similarly, contracts for investment-management services that don't measure appropriate benchmarks thoughtfully, or the underlying risks managers are taking, also just don't make sense.

The related problem is the horizons across which these contracts get implemented. We are trying to measure performance and value creation over very short horizons, even when we know that it's almost impossible to disentangle skill from luck at such high frequencies. I like to use the analogy of sports because managers and investors like to think of themselves as athletes. There is no great difficulty in disentangling luck from skill in Roger Federer's game or LeBron James's game—their performance reflects their effort and skill. That clarity in separating luck from skill is lacking when assessing managers and investors. Only *very* long horizons can help solve that problem.

It is tempting to view my argument as some kind of an "Occupy" document: these people are getting paid too much. Just to be perfectly clear, I think managerial talent and investment talent are two of the most precious things in a market economy, and I love market economies. High-quality managers and investors should be richly rewarded. My problem is not with the *level* of compensation, it's with the *form*. Contracts that don't measure performance relative to appropriate benchmarks or that claim to disentangle luck from skill over short horizons can do more harm than good.

HM: *What problems do typical, ostensibly market-based, management and asset-manager compensation agreements cause?*

MD: If the only adverse result of these contracts was a bunch of windfalls for being lucky, it's not a problem *per se*. The real problem is the risk-taking these contracts induce. We know such contracts give rise to risk-taking incentives for people to increase stock prices at shorter horizons by doing things that may not lead to the long-run success of those organizations. That kind of asymmetric contract has been shown to be at the heart of a number of governance problems on the managerial side. The remarkable wealth obtainable simply by influencing short-run outcomes distorts people into decisions that are not in the interest of the long-run shareholder.

Mihir A. Desai

In investment management, the similar notion in the alternative-asset industry is predicated on the so-called "two and twenty contract": alternative-asset managers get a management fee of 2 percent of the asset value annually and 20 percent of investment gains—the "carried interest." The logic is simple: I give you $100, you make it into $120—therefore, you must have created value and deserve 20 percent of that $20. You get skin in the game as a consequence, and our interests are aligned because you succeed only when I do. That sounds fair and right.

The first problem with that logic is that we need to know how the rest of the market and comparable investments did. Otherwise, that compensation is a windfall. More important, we need to be able to observe the risk and the leverage the investment manager undertook in order to make that $100 into $120. If you don't observe that perfectly (and you never can), then you are partly giving an incentive for the manager to take on risk—risk that you don't quantify or penalize for. Making matters worse, we measure their returns and compensate them over a short horizon, further inducing them to take on risks over the short run. Finally, we're not typically charging for the illiquidity the manager imposes on the ultimate investor when I have to lock up my money inside a fund for many years. We all found out during the financial crisis that illiquidity is very costly. In short, we induce risk-taking on both sides of the capital market by naively structuring these contracts over short horizons and without sufficient attention to the risks being undertaken or illiquidity being imposed.

Being a shareholder has been mediocre at best, being a manager has been wonderful, and being an investment manager has been absolutely exceptional. That strikes me as unsustainable.

A guiding principle of the rise of alternative assets is the proliferation of the idea that they can provide "alpha," or excess returns, to their clients. Indeed, the raison d'être for much of the industry is the belief that alpha is readily quantified and obtained. Many of these claims are difficult to substantiate when one uses an appropriate benchmark for their investments, properly accounts for leverage, and properly penalizes them for the illiquidity they impose on investors. So the final problem is that, to justify these contracts, many of the ultimate investors—pension funds and foundations—are promised alpha that never materializes. Of course, they're equally culpable because part of the attraction of this promised alpha is the ability to mask their underfunded pensions.

Just to be clear, a considerably smaller alternative-asset industry is likely well justified for investors with true talent. But the claim here is that this industry mushroomed well past what can be justified by their returns, in part because of the naiveté of these contracts and the search for the "free lunch" of excess returns.

HM: *So these incentives lead to behaviors that may not be productive in the long term and can also lead to crises?*

MD: Yes. One of the things I wanted to do is provide an alternative history of the financial crisis. In my article, I discuss the rapid growth of the alternative-asset industry in the late 1990s and early 2000s in response to very low interest rates after the Internet bubble. I use contemporaneous accounts to show that the rise of the alternative-asset industry triggers risk-taking inside traditional Wall Street establishments as they compete to hold on to their people and retain customers. Wall Street saw the rapid growth of an operating model with even more operating leverage and profitability than their own—and came to mimic it by providing more risk capital to their own traders and employees.

It's tempting to say there's some big ethical problem here—this generation just doesn't have the morals of the last one. I think this is naive. These *contracts* are giving rise to the risk-taking and short-term thinking. Young investment managers could access completely mind-blowing wealth based on six or 12 months of performance, because as soon as they produce those results, more funds start to flow in and before you know it, they are running another large fund and after another 12 months of reasonable returns they are going to be in a world of compensation they could never have imagined. That's going to give rise to problematic risk-taking.

To return to capital allocation for a moment: *financial* capital is being allocated by these investors, *real* capital is being allocated by corporate managers with similarly distorted incentives, and then *human* capital is being allocated when we see our young graduates choose their fields in response to these skewed rewards. When the structure of relative rewards gets so out of whack, in part because of these naive contracts, then people start making human-capital decisions that are likely not socially optimal. And, of course, the allocation of talent, particularly way out in the tail of the distribution of talent, matters enormously for all of us.

HM: *Are these problems susceptible to regulatory reform, changes in taxation, or better ethical education for managers?*

MD: I am somewhat pessimistic about the usual recommendations. Handwringing about ethics is not my preferred solution because it obscures the critical role of incentives as you see them playing out in society at large. Indeed, these are often very good people responding to crazy incentives.

Using regulatory or tax instruments is likely problematic. As a public-finance scholar, I'm keenly aware of our fiscal problems, and reforms should be geared toward those problems rather than fine-tuning governance. Indeed, fine-tuning our tax system to target compensation practices can lead to unforeseen consequences. The one exception that I think is advisable is correcting the characterization of carried interest employed in the alternative-asset industry as *capital* income rather than *labor* income. This preferential treatment of earned income effectively increases the subsidy toward these high-powered incentive contracts.

I think the first step in improving things is popping the underlying myths—that we can use financial markets naively to measure performance over short horizons and that excess returns are easily measured and obtained if we just put the right incentive contract in front of a smart person. In fact, markets are roughly efficient and alpha is hard to measure and fairly scarce. And discerning who is a good manager or good investor can take many, many years—contracts need to be restructured to reflect that.

Second, we have to awaken institutional investors, particularly large pension funds, foundations, and endowments, to their responsibilities. In effect, by outsourcing performance evaluation and compensation to financial markets, these institutions have abdicated their fundamental responsibility and achieved a sort of plausible deniability. Board members can say: "I don't have to evaluate my manager because I have a neutral, objective measure of performance—the stock price. I didn't pay the manager a lot of money—I just made sure our interests were aligned." Similarly, managers of large pension funds can say, "I didn't lose any money. I just gave your assets to the best outside investment managers, or the best funds of funds, so you can't fault me for any losses." That is why this problem is so difficult—we can't expect markets alone to solve this because the underlying problem is that there are monopolistic providers of pension services. The ultimate governance providers in our economy are the large institutional investors—state and corporate pension funds, endowments—and you can't unseat them.

Awakening institutional investors is the best chance we have to fix this. That is starting to happen. It could happen much more—for example, institutions should be playing much more active roles in compensation practices by reinserting judgment into executive compensation, challenging existing compensation arrangements, and significantly lengthening the horizons over which managers and investors are evaluated.

On the alternative-asset side, there is much to be said for creating a uniform system for reporting results so asset managers can no longer live in Lake Wobegon where *every* manager is in the top quartile of performance. Recent developments in Canada are also instructive: their pension funds have figured out that they can disintermediate alternative-asset investors and do transactions themselves. Somehow, in the U.S., we've come to a place where it's easier to pay outside alternative-asset managers more money than an internal pension-fund manager will ever see. The Canadians have shown us the opportunity to reclaim a chunk of that investment function. Finally, requiring a fuller funding of pensions would help enormously—so the temptation to swing for the fences by investing in asset classes that promise alpha will become restricted. The easiest way to avoid the reckoning of an underfunded pension is to assume you can make higher returns by allocating more and more assets to individuals who promise alpha. So the problem gets worse as those returns turn out to be illusory.

For people who care about shareholder capitalism, the past 15 years have to be deeply worrying. Being a shareholder has been mediocre at best, being a manager has been wonderful, and being an investment manager has been absolutely exceptional. That strikes me as unsustainable. I think the proliferation of these naive contracts via the financial-incentive bubble helps explain these patterns.

MAXIMILIAN STOCK LTD/CORBIS IMAGES

Metalwork training at a vocational school in Germany, a high-wage, manufacturing powerhouse—and a model of skills- and job-focused training that U.S. employers and educators might want to emulate

The Workforce

"All the other things we used to think about as a social contract…"

Thomas A. Kochan, Bunker professor of management, MIT's Sloan School of Management, and co-director of the MIT Institute for Work and Employment Research

Harvard Magazine: *You speak of a fundamental human-capital paradox in the way American employers and workers interact with each other.*

Thomas Kochan: American corporations often say human resources are their most important asset. In our national discourse, everyone talks about jobs. Yet as a society we somehow tolerate persistent high unemployment, 30 years of stagnating wages and growing wage inequality, two decades of declining job satisfaction and loss of pension and retirement benefits, and continuous challenges from the consequences of unemployment on family life. If we really valued work and human resources, we would address these problems with the vigor required to solve them.

HM: *What causes this disconnection?*

TK: The root cause is that we have become a financially driven economy. The view of shareholder value as corporations' primary objective has dominated since the 1980s. That motivation—to get short-term shareholder returns—then pushes to lower priority all the other things we used to think about as a social contract: that wages and productivity should go together, that there should be an alignment between the interest of American business and the overall American economy and society. That creates a *market* failure: it's not in the interest of an *individual* firm to address all of the consequences of unemployment and loss of high-quality jobs, but the business community overall depends on high-quality jobs to produce the purchasing power needed to sell their goods and services to the American market. Sixty percent of U.S.-based multinational corporations' revenue still comes from the U.S. market. We've got to solve this market failure.

But I think there is also a deep *institutional* failure in the United States. We have allowed the labor movement and the government and our educational institutions—the coordinating glue that brought these different interests together and provided some assistance in coordinating economic activity—all to decline in effectiveness. Government is completely polarized and almost impotent at the moment. Unions have declined to the point where they are no longer able to discipline management or serve as a powerful and valued partner with business to solve problems. And I'm concerned that our business schools particularly have receded into the same myopic view of the economic system where finance rules everything, so we aren't training the next generation of leaders to manage businesses in ways that work for both investors and shareholders *and* for employees in the community.

HM: *Is there a jobs crisis?*

TK: There's a crisis with two dimensions. First, we still have not recovered from the last recession: we're still about five million jobs short of getting back to where we were. The best estimate is that it's going to take us the rest of this decade and we're going to have to create about 20 million jobs to make up for those lost *and* for the growth in the labor force. That computes to about 200,000 jobs a month, and we're not even coming close.

The second element of the crisis has been going on since 1980. Wages for average workers have been stagnant, so we have seen both the growth in inequality (as a high proportion of the income gets distributed to the top 5 percent or 1 percent of the population) and we have seen a gap develop between wage growth and productivity growth. From the 1940s through the 1970s, we had an implicit social contract where they moved in tandem. That broke down: since 1980 we've had about 84 percent growth in productivity but only 10 percent growth in median family income and 5 percent growth in wages. We've got to address both dimensions of this crisis to get the economy back on track.

HM: *What has happened to the quality of jobs and the match with workers' skills?*

TK: An average employee who gets laid off from a good manufacturing or service job at age 45 is likely not only to experience extended unemployment but to take a loss in wages when he or she finally gets reemployed. The average employee loses between 15 and 20 percent. Those who don't find another job and have to retire early, or drop out of the labor force, or go back to school, obviously have deeper losses. They are likely to be unemployed longer today than they were in the past; over 40 percent of those who are unemployed are unemployed for more than six months—a long time to be without a living wage. They also bear the social costs of unemployment in terms of impacts on families, health, divorce rates, suicide, even mortality. There's evidence that those unemployed for a long time have a lower life expectancy. Children of unemployed parents don't learn as well in school.

As for employers, we have this paradoxical situation where some say they can't find the skilled workers they need. That in part reflects changes in technologies and in industry and product mix in the U.S. as employers try to transform to a higher value-added economy—to a more high-technology-, social-media-oriented economy. The technical and behavioral skills, problem-solving skills, analytical skills are all in very high demand—and those are not necessarily the skills of the prior generation. So while we are producing young people with many of these skills, many of the unemployed don't have what is needed. This problem is entirely solvable for those already in the workplace *and* young students alike. We just have to rebuild and expand apprenticeships, get more community colleges working closely with industry, and adapt our education system (K-12 and our four-year universities) to make sure that we get more of our young people into the STEM fields—science, technology, engineering, and math disciplines that are in high demand.

HM: *Where does the responsibility for that training lie?*

TK: The good news is, people are beginning to recognize that we have a crisis. The bad news is, we don't have leadership yet that has stepped forward to say we're going to bring these groups together to solve the market failure and rebuild our institutions to get the job done.

Business schools have not only a special opportunity but a *responsibility* to do so. We know how to bring groups together, we teach multiparty negotiations and collaborative problem-solving, we teach leadership. It's time for us to say to American in-

Thomas A. Kochan

dustry leaders, labor leaders, and our community colleges: Let's get together and identify, within our respective regions, what skills you need. How can we contribute to making sure that the four-year universities are providing the right mix of skills? How can we build more internships and co-op programs with you and use our online-learning technologies to retrain or give second-chance education to people who have the intellectual capabilities needed to learn these skills? How can we learn from the best examples? There are many: from North Carolina's community colleges to Wisconsin, where there are very good technical schools linked to local industry—whether manufacturing or advanced information technology or healthcare. We need to make sure we're working with state-of-the-art technologies and job specifications and that employers are engaged collectively so they share the cost but can also share the benefits by hiring the graduates.

That's not rocket science, that's leadership and institution-building. We could do that—we don't have to wait for a big government program (although I do think the federal government has an opportunity and responsibility as well).

HM: *In the finance-driven model of business, it is perhaps easiest to treat everything as a cost. What about the alternative that invests in human capital and considers workers a source of innovation and service enhancement—competing on the basis of product development, innovation, and quality?*

TK: There's good news on this front as well. In every major industry you can find leading employers who have decided they are going to invest and compete on the basis of having the best, most fully engaged, and most productive workforce—characteristics that support the higher-wage profile.

In every major industry you can find leading employers who have decided they are going to invest and compete on the basis of having the best, most fully engaged, and most productive workforce.

The favorite example is Southwest Airlines. Their business model is not to compete on the basis of lowest *labor* cost but keeping their *unit* cost low and their productivity high by turning their planes around more rapidly than any competitors: they make money by flying planes rather than having them sit on the tarmac. To do that, they have to select people who are capable of working in teams and motivated to work together. They have to train people. They have to have union contracts that don't have a lot of cumbersome work rules, so they get the flexibility to work together to solve problems. They have produced high levels of profits and good wages, and for the last two decades have always been on the *Fortune* list of the 100 best places to work.

We need to learn from those examples: Southwest or Continental airlines; Kaiser Permanente in healthcare—they have an advanced partnership with their employees and unions and are way ahead on automated medical records and teamwork among doctors, nurses, and technicians. In manufacturing, there are examples in the steel and automobile industries of how to do this.

But we aren't making those the norm. We should make sure no one comes out of our universities to be a future business leader, an entrepreneur, or even a middle manager, who doesn't have the skills and knowledge to build these "high-performance" work systems, as they're called, and who sees that as a way to compete that works for both shareholders and the workforce.

HM: *What does that model imply for workers and unions?*

TK: If unions want to have a future in the United States, they need to be the champions of giving workers the training, skills, and opportunities to add value to their enterprise—and then be able to negotiate a fair sharing of the returns that they help to generate. That's how labor unions could add considerable value and discipline management—in a way that works for the benefit of the firm as well as for the workforce. Workers should be demanding that of their employer, their union, their professional association. They should be demanding that in their university education—skills that prepare them to add value in these ways and to lead others so everyone is adding value. That way, we can compete effectively, with a high-quality American workforce.

HM: *Are there implications for other levels of education?*

TK: The best elementary and secondary schools now educate young people to be more skilled in working together (with team assignments), in communications and problem-solving, even in negotiations and conflict-resolution. We need to get that curriculum embedded all over the country: strengthening math and science *and* these behavioral skills. Universities are doing a lot more of this. At MIT, we're exposing our fantastic engineering and science undergraduates to leadership, problem-solving, negotiations, how real organizations work—how to sell their creative, technical ideas to people in authority. But we have a long way to go. We're farther along with undergraduates than with graduate students—particularly in the business and professional schools.

HM: *In human development, are companies disproportionally spending on upper management, as opposed to "middle skills"—the operating skills that used to be taught in apprenticeships?*

TK: It's a gross misallocation of resources to spend millions on executive education for middle managers or senior executives while systematically underinvesting in people who develop the products, manufacture them, and service them. These middle skills are eroding because firms have given up on training. They expect to be able to buy all these skills on the market, and don't want to invest in training because they're afraid if they do their competitors will hire these newly minted high-skills employees away. Employers need to reinvest by engaging each other in their industry, in their location, sharing the cost and the benefits. The internship model, the co-op model, the local-industry collaborative that works closely with universities to make sure they're training and educating people in up-to-date skills and technologies is a model that has proven its effectiveness. We need to multiply those models many times over.

HM: *Are other countries doing things better?*

TK: The problems are more severe in the U.S. because we have such a tradition of individualism. We don't have a history of collaborating between labor and management or with other businesses.

Germany has a well-established vocational-education program funded at the regional level; industry is very much involved in shaping the standards and curriculum and hiring the graduates of those programs. We're not going to have a single system like Germany's. But the best examples around the country are where local industry works with local education institutions to tailor programs to suit the regional industry mix. That's why the buzzword is that you have to have an "ecosystem" in the region: Rosabeth Moss Kanter emphasizes this—and she is right to do so (see below). We need to bring education, training, human-resource systems, finance, the supplier community, and the infrastructure together—that's what we mean by an ecosystem. We've got to make sure the workforce is addressed as part of a modern ecosystem for a competitive industry cluster.

The federal government should be a catalyst for this kind of innovation and institution-building. The best analogy I can think of is the model being used in education, with "Race to the Top" funds. Create the same incentives for community colleges, universities, and industry collaborative institutions.

We know there are a couple of key ingredients to successful training and education: the close links between industry and education that we've been talking about, and using adult-based learning models with a mix of classroom and on-the-job application through internships, co-ops, or apprenticeships. Third is a career pathway, so there's a continuous opportunity to progress and to learn. It's got to be collaborative—engaging the business *community*, not just an individual firm.

If we say any program that meets those basic principles will get matching funds from the federal government and if you don't, you won't, you would see changed behavior at the community level where we need it. Race to the Top has produced enormous national change. The job of the federal government here is to get that same innovation at a scale sufficient to have effects on our overall jobs and economic competitiveness. The federal government doesn't have to tell you what to train people in or force you to do this. It has to say, "Meet these basic principles in ways that fit your particular circumstances and we will share in the investments—and if you don't, you're on your own."

The Business Ecosystem

"A country can become complacent about its assets."
Rosabeth Moss Kanter, Arbuckle professor of business administration, in HBS's general management unit, and chair and director of the Harvard University Advanced Leadership Initiative

Harvard Magazine: *What do you mean by "enriching the business ecosystem"?*

Rosabeth Moss Kanter: "Ecosystem" conveys the idea that all the pieces of an economy come together in particular places, and that their strength and interactions determine prosperity and economic growth. In Silicon Valley there is a sense that you prosper only because you're surrounded by lots of resources that make it possible to succeed, beyond what your own entity controls. Think of it as your garden, where you need fertile soil, seeds, and other ingredients to make things grow.

I chose "enriching" carefully because it not only means richer nutrients in your garden, but also the sense that we want continued prosperity. We want more people to feel they have rich lives and opportunity ahead. That is important.

In the mid 1990s, I worked on helping communities around the country adapt to disruptions from the Internet and globalization—trends that were very good for the prosperity of the country overall, but had communities worried about being left behind. I developed the idea associated with this transition from the industrial to the digital in *World Class*: competitive communities had to reach the highest standards in the world because your customers and employers now knew what the highest standards were, and didn't necessarily need you to access them—they could go even outside their country. Those developments pointed to networks and larger systems—what cities and regions and small businesses needed to do to remain prosperous.

I identified three archetypes then, suggestive of different kinds of ecosystems. Greater Boston, like Silicon Valley and Austin,

Rosabeth Moss Kanter

Texas, prospers because of *thinkers*—if you innovated and had new ideas, you attracted resources. Companies gravitate to new ideas because innovations sell at a premium in world markets. Spartanburg-Greenville, South Carolina, exemplified *makers*. It became a global manufacturing hub and attracted foreign companies by investing in American workers, especially in the skills needed for advanced manufacturing of, first, textile equipment and eventually automobiles. Today, that area has become the new Akron (while Akron has moved on to new technologies): it leads in making tires, having broadened its manufacturing skills. My third model was Greater Miami, a region of *traders* that went from being a sleepy southern city to operative capital of Latin America, attracting finance and logistics and many companies' Latin American regional headquarters.

In Silicon Valley there is a sense that you prosper only because you're surrounded by lots of resources that make it possible to succeed, beyond what your own entity controls.

In each of those places, leaders created a regional theme and invested in aligning many organizations to support it.

HM: *What factors make that ecosystem function better?*

RMK: Four issues strike me as key: turning ideas into enterprises; linking small and large businesses; better connecting education to jobs; and encouraging cross-sector collaboration. Each focuses on actions on the ground, in different regions, within our national and business contexts—whatever those may be. Let me give an example. Civic leaders in Milwaukee are creating a global hub for water-related businesses by linking manufacturers of pipes and controls with entrepreneurs who are creating urban fish farms, and both with new research centers—including the nation's first graduate school of freshwater sciences.

The first is how *ideas* become *enterprises*. This has been such a great U.S. strength that we haven't nurtured it. A country can become complacent about its assets. There is an assumption that small start-ups create the lion's share of jobs, but since the financial crisis they have lost their leading position in terms of the number of jobs created. And the start-up survival rate slipped a little—slightly less than half survive at the five-year mark.

For all the money poured into scientific research, very little was finding its way into the marketplace. Basically MIT and Stanford were taking the lead in finding ways to license ideas that have commercial potential. Elsewhere, there was a tendency to emphasize the revenue from selling a license, rather than whether an enterprise created jobs. Knowledge is the best resource we have. It wasn't any particular industry that made the difference in the transformation and prosperity of Boston and eastern Massachusetts—it's our fundamental ability to keep creating new knowledge. So, how do you make sure that knowledge creates jobs, and those jobs reach all parts of the community and that knowledge will be translated into a global competency?

There is evidence that if you make the connections between knowledge creators and businesses tighter, you can increase success. Compared to stand-alone business incubators, university-based incubators tend to keep more people *in* the community to start their enterprises and tend to have higher success rates, because they are able to connect small enterprises with mentors. Small business needs capital but it also really needs expertise—so Harvard's new Innovation Lab is a fantastic thing.

Another aspect of moving from knowledge to enterprise to jobs is *collaborative* knowledge creation. It's very difficult to manage, but if you get a number of companies collaborating with a number of universities, you have a better exchange of ideas, and you're also more likely to have competition among them to apply the knowledge. The semiconductor consortium in Albany is an example. A university had already invested in a technology of the future and that attracted investment from lots of companies, no one of which would want to make that investment alone. In time they will want to have their own proprietary piece, but then you can get the business-school students excited about the opportunities in these fields and you begin to thrive locally in the global economy. That's thinkers *plus* makers in Albany.

We have long relied on federal funds from the National Science Foundation and the National Institutes of Health for the basic research that supports innovation—private companies cannot support enough basic research on their own. We have seen how in biomedical science, subject to suitable controls, networks productively connect publicly funded research and privately funded companies, hospitals, and other local institutions. We need to continue those investments, but those and other federal expenditures have to be better targeted because not every city needs a semiconductor consortium or a biomedical focus. You want to invest in places that can take the best advantage of certain strengths, and then have other places find *their* key assets, so they can compete for some of that funding, too.

HM: *How do new ventures operate more successfully in a stronger business ecosystem?*

RMK: That's the second idea: small businesses—particularly new enterprises—often need larger-company customers. When they're in the purchasing stream, they do better. In fact, tech companies funded by *corporate* venture capital often also got a customer who helped improve the product. I've done a very informal study that shows that dominant companies in seven different technology sectors might have had better partners earlier. Every small firm benefits if it can get more business from large ones. It's not just revenues; they also get competence and opportunity.

So, how do you connect small to large? We should have a national call to action with commitments from big companies to mentor and connect with smaller enterprises. Procurement became global because it was more efficient to consolidate global purchasing. But global supply chains are cumbersome. Many would rather buy here if they could find more sophisticated suppliers more easily in the U.S.

I was a consultant to IBM and mentioned this idea; they ran with it and created Supplier Connection—a universal vendor application, kind of like the common college application. They announce opportunities through Supplier Connection to thousands of small businesses. Initially, about 16 big companies started with a few purchasing areas—and expansion plans are in the works. Everywhere I've spoken about these ideas, civic leaders get very excited about linking small to large in their own region.

HM: *What about the linkage between education and job skills?*

RMK: We have been talking about school reform since I was a child in school. Preparing people for the workforce is getting more critical today: up to three million jobs are unfilled because of an absence of vocational skills—"middle skills." Germany is an economic success because of a manufacturing system in which people apprentice to learn skills. Sometimes they then go on to four-year colleges and get advanced degrees, but skills apprenticeship is a much more prominent part of the workforce.

Our strength has been from the ground up. National policy can certainly facilitate things—or not—but you don't have to wait for a government law or allocation.

Where do those skills come from? Community colleges are suddenly the darlings of the U.S. policy world because they're the only entities we have that are supposed to prepare people for occupations. Every tech area of the country has a shortage of software engineers—who need some programming, but *not* a four-year degree. You can send data anywhere. Are we going to outsource those jobs?

In fact, community colleges *haven't* been well connected to employers—and their graduation rates have been incredibly poor. In Chicago, fewer than 9 percent of those who start have graduated within six years. It's the problem of disconnection. But when connections between employers and community colleges or training centers are strong—for curriculum development, customized job training, post-graduation interviews—outcomes improve dramatically. There are growing consortiums where leaders of organized labor, community colleges, high schools, businesses, and representatives of the elected officials sit down together to talk about skills needs and who's going to help deal with them. The two-year colleges in Spartanburg and Greenville were the secret to that manufacturing center. South Carolina is still not the most prosperous state, but it would have been Appalachian poor if not for Governor Dick Riley (later U.S. secretary of education) focusing on the community colleges in collaboration with the industrialists.

It strikes me as such a no-brainer, but there's no real national policy here. What an opportunity: the evidence is that you get better outcomes in terms of people finishing their two-year programs and getting jobs when there's a closer tie to employers. This is a way for people to learn useful skills, ways of thinking, science and technology. Rethinking education and work is ripe for innovation. New York City opened its first six-year high school in 2011: a partnership of the schools, the community-college system, and IBM. Urban students, selected randomly, start college courses as early as tenth grade; when they finish grade 14, they will earn a high-school diploma, an associate's degree, and a job interview with the company. New York is already expanding this model, and Chicago has adopted it with other technology companies.

HM: *Does that amplify your concept of place-based business ecosystems and connections among actors "on the ground?"*

RMK: Yes, as I was looking for ideas to solve a lot of problems at once, the final one is community leadership and collaboration across sectors. Even if we suddenly had a national program throwing money at community colleges, you still need community leaders talking to each other—where people agree on certain priorities, align their interests, align what they do behind those priorities. Those with management competence can help those without—whether public helping private or vice versa. Those collaborations are fruitful and a source of exciting institutional innovations—from universities incubating ventures to six-year high schools to regions becoming world-class by focusing on areas of knowledge that also stimulate local businesses.

In general, every social and economic institution comes together *on the ground* in business ecosystems like Boston or Albany. You can have national policies for X, Y, or Z, but they intersect in particular places. I return to that because everything wrong with America is more easily fixed, can become right with America, *on the ground*. That's where you have less partisanship. People are fighting in Washington about the size of government, but local civic leaders, private businesses, and ordinary citizens see connections in their own particular place. That's always been an American strength. We can't compete with China's national government, tearing down an area and having an entire new city in a year or two. That's not how we operate. Our strength has been from the ground up. National policy can certainly facilitate things—or not—but you don't have to wait for a government law or allocation.

If I were handing out federal funds, I would give more money to those who prove they've got such a partnership, who have a commitment to collaboration across sectors and who create institutional innovations. There's a role for businesses large and small, government, and civic leaders dedicated to their regions. Local is beautiful, even if national can sometimes get ugly.

The Other Commons

"Political dysfunction may well be an important part of the problem."

David A. Moss, McLean professor of business administration and founder of the Tobin Project

Harvard Magazine: *The competitiveness project's survey research shows that managers and business leaders are concerned about the political system—it looks messy and dysfunctional.*

David Moss: Yes, this seems like a new twist on the competitiveness debate. Of course, worries about the *economic* health of the country are nothing new. In the 1950s, there was great fear that the Soviet Union would eventually outproduce the U.S. Then there was a good deal of worry about Japan in the 1980s—that Japan was an economic juggernaut, and the U.S. couldn't possibly keep up. Both fears turned out to be overblown.

Perhaps my favorite example relates to late eighteenth-century Britain, when skeptics were saying the country was in decline—that its public debt was too big and its products were no longer of high quality. But Adam Smith said the pessimists were wrong, and we now know he was absolutely correct—Britain was on the verge of an economic takeoff. The rationale Smith offered in 1776 is especially interesting. He suggested that in a dynamic economy, the biggest (and thus most visible) industries are frequently in decline, and the newest, most vibrant ones aren't yet visible. This is why a country could have a very promising economic future yet still appear to be in decline.

The lesson here is that we need to be cautious about our economic pessimism. It's easy to get carried away. So as we think about some of the political challenges America faces today, we need to be equally cautious.

That said, in past discussions of America's economic health, the focus was predominantly on economic and business factors: interest rates, tax rates, labor costs, supply chains. Now it seems we also need to pay close attention to the political system. One has a sense that it's increasingly dysfunctional. In fact, when our HBS alumni were surveyed about strengths and weaknesses in the American economy, they identified the political system as the biggest weakness going forward. It appears Standard & Poor's came to a similar conclusion during the debate over the debt ceiling last year. When S&P downgraded the nation's credit rating, there wasn't any serious question about the country's *capacity* to repay its federal debt. The U.S. had (and has) plenty of GDP. The real question the rating agency raised—the basis for its downgrade—was whether the nation's political system is reliable enough to ensure continued repayment. The extreme political brinksmanship that characterized the debt-ceiling fight was profoundly unsettling for S&P's analysts—and perhaps rightly so.

Putting these pieces together, I think there's reason to worry about the long-term economic health of the country. I remain optimistic—but nervously optimistic. Although we've seen GDP growth over the past few decades, it's been highly concentrated among top earners—most Americans haven't seen nearly as much income growth as past generations have. Will broad-based growth return in the future? I sure hope so. But we need to think hard about what's causing the problem.

I'm not sure the traditional explanations work so well. For example, I don't think the fundamental problem relates to the way our firms are managed or the nature of our trade infrastructure (though we still have to work on both). In my view, *political* dysfunction is likely a more serious impediment to a healthy economy. Are we doing what we need to do in terms of developing our human capital? Clearly not. Whether from the right or the left, do we have an energy policy that makes sense? Not really. People can debate the individual healthcare mandate, but the ultimate question is, can we continue to afford spending over 17 percent of GDP on a healthcare system that appears less productive—less effective, in many cases—than those of other rich, industrial countries? In terms of our fiscal position, the federal government is spending about 24 percent of GDP while taking in about 16 percent of GDP in revenues. It's obvious that we need to cut spending and raise taxes over the long term—yet the political system can't deliver that. In fact, it's having trouble addressing any of these major challenges in a coherent way. So political dysfunction may well be an important part of the problem.

HM: *You have found periods when Americans, though skeptical about government, have agreed on steps to reduce debt and pay for public services. Does that context inform the present?*

DM: Yes, absolutely. But first we have to ask: is there something different about the problems facing the political system today? After all, in nearly every generation, Americans have complained about how their political system "doesn't work as well as it used to." Although the same may be true today, I think we *do* face some distinctive political challenges. Consider the research that Nolan McCarty, Keith T. Poole, and Howard Rosenthal—three superb scholars—have put together on political polarization in Congress. Their data show it is at or

David A. Moss

near an all-time high. We're seeing more distance between the parties and less ability to compromise than we have in a long, long time.

In fact, the issue of compromise is itself interesting, and starts to get us back to your question. Many people think of compromise as meeting in the middle: I give a little, you give a little, and in this way we reach a solution. But there's another form of compromise that we sometimes forget about: instead of meeting in the middle, each party gets what it most wants. If one person wants to visit Miami and the other New York, they could settle for Washington, D.C.—or they could agree to go to Miami this year and New York the next. Some of the most important political accommodations in American history have involved the latter sort of compromise—choosing the best from column A and the best from column B.

Since the days of Jefferson and Hamilton, Americans have harbored profound disagreements about the proper role of government. One side sees government as the problem and seeks to limit it and get it out of our lives; the other believes government can be harnessed to solve important problems, particularly those that individuals have trouble solving on their own. Both views have been enormously productive over the course of the nation's history: in fact, one key to American economic success is that the nation's governance has long been rooted in two great philosophies of government, not just one. And reconciling the two has not always involved meeting in the middle.

Consider the extraordinary thing that happened in the mid nineteenth century, when many states introduced strong budget rules that sharply limited public borrowing—something the Europeans should look at very closely today. Back then, the push for fiscal responsibility, often rooted in state constitutional provisions, came mainly from small-government conservatives. In New York, for example, the group that secured a constitutional amendment to limit borrowing, the Barnburners, in some ways was very similar to the Tea Party today. One important difference is that the Barnburners were more allergic to debt than to taxes—and even willing to raise taxes to bring down debt, where necessary. But they were deeply upset about fiscal excess, and went to great lengths to bring the state budget under control.

The integrity and health of the nation's democracy are of incalculable benefit to everyone who lives and does business in the United States. This is true even strictly in economic terms.

Now, at virtually the same moment, there was another strong push—from the other end of the political spectrum—for free public education at the state level (financed by taxes, rather than private tuition charges). This represented a radical development at the time, the virtual socialization of an industry. It was enormously controversial. Ultimately, though, the rise of public education constituted a powerful competitive advantage because it moved the United States far ahead of most other countries in terms of education and human capital development.

What's especially remarkable is that many states put *both* in place nearly simultaneously: strong legal provisions for limiting deficit spending *and* public education financed by new taxes. Two powerful ideas from two very different parts of the political spectrum. In this case, as in so many others, progress was achieved not by meeting in the middle, but rather by adopting the best of *both* sides.

I think this is an important example for us in 2012. We need to think about how to get our federal budget into long-term balance—perhaps through some sort of balanced-budget provisions with appropriate escape hatches—and, simultaneously, how to invest more effectively in human-capital development. That is the type of compromise we should be aiming for: the best of both.

Which brings us back to the question of ideology. Some observers look at the paralysis in our political system and assume that ideological divisions are the cause. I don't see it that way. As I've said, these sorts of divisions have been around for a very long time in America. Instead, I believe that the central source of weakness in our political system today is an absolutist view of politics (and political tactics)—where *any* success for the other side is seen as a devastating loss for your side. A good friend at MIT, Stephen Van Evera, refers to this as a Leninist orientation—thinking of politics as war, where winning is everything and compromise is a dirty word. I would say this Leninist approach is profoundly inconsistent with sustaining a healthy democracy. *This* is the piece of American politics that's dysfunctional. We can have different views of government—that's as American as apple pie—but we need to get back to a place where it's possible to govern on the basis of *both* perspectives—and get the *best* of both, rather than fall into a cycle of unending political warfare and paralysis. The problem isn't ideology. It's *politics as war,* and that's what Americans need to reject when they go to the voting booth.

HM: *Do politicians who approach governing as a fight to the finish fundamentally differ from business leaders, who make pragmatic decisions as they adjust and adapt operations?*

DM: That's a great question. The business sensibility tends to be highly pragmatic: problems come at you, and you need to try to solve them. That said, if you develop a better product, it might put your competitors out of business. It's hard to be too upset about this, because we all benefit as consumers from the introduction of better products. That's business.

I'm not sure the same logic entirely applies in politics. If one political party could destroy the other, the country would be poorer, not richer, as result. That's because there's an important shared element to our political system. Whatever side you're on, you need the other side to be healthy or the democracy will break down. In politics, in other words, we have to be especially careful in thinking about the integrity of the *system as a whole.* Individual politicians often have a greater responsibility in this regard than they realize.

HM: *Do today's CEOs differ from their predecessors? They're measured and compensated in a shorter-term way. If they run global enterprises, they are less locally rooted. They have strong incentives to lobby for short-term benefits, like tax loopholes. Have their ties to a functioning democracy weakened?*

DM: One theme my colleagues on the competitiveness project have emphasized relates to the broader business environment—the "commons"—and whether business support for the commons at local and national levels has diminished as the economy has globalized. If we are underinvesting in human capital, physical infrastructure, and other elements of the business environment as a result of such neglect, this certainly requires attention.

I wonder if much the same thing may be going on with respect to the political system—that is, whether the *political* "commons" has been increasingly neglected. The integrity and health of the nation's democracy are of incalculable benefit to everyone who lives and does business in the United States. This is true even strictly in economic terms. Think about all the elements of the business environment that are products of *political* decisionmaking—from rule of law and property rights to a stable monetary system and even protection from foreign foes. Just as good governance is essential for high-performing firms, good governance is essential for high-performing countries. So I think this idea about the commons is certainly applicable in the political sphere. If we allow our political institutions to atrophy, the economic health of the country *will* falter in time. So we need to be vigilant about this.

THE LIBRARY OF CONGRESS

Adam Smith, author of *The Wealth of Nations*, was prescient about dynamic economies in preindustrial Britain. Might he caution against excessive economic and political pessimism in the United States today?

Now, returning to CEOs, if it's true that they are less focused on the business commons than they used to be (given the forces of globalization, for example), then perhaps they are also somewhat less attentive to the state of the *political* commons than they used to be. Is this the case? I don't know. But it's an intriguing question.

Certainly, we all need to think about our own responsibilities as members of a democracy. We all need to vote, to think carefully about the issues, to formulate our own opinions and be respectful of others'. In the same way, CEOs have a responsibility to think about *their* role in sustaining and strengthening the democracy, and sometimes this could involve forgoing opportunities for short-term political victories. It may seem idealistic—even naive—to speak in these terms, but I believe this sense of responsibility is absolutely essential if we want to ensure the long-term health of our political system.

HM: *What can business leaders do?*

DM: Let me talk about what *all* of us can do. We need to work as hard as we can to preserve and strengthen our *culture of democracy.* That means, in part, rejecting "politics as war," which is so inconsistent with healthy democratic governance. But it also means making certain investments—in education, for example. There has been discussion recently about civics in the classroom. To a large extent, it has disappeared; and even in states that still have civics programs, the curricula are often out of date and not especially exciting. If we could revive civics—or, more broadly, the study of democracy—in high school and college in a truly effective and engaging way, that by itself could have a very positive effect over time. In fact, we should be thinking about how best to do this here at Harvard and at other colleges and universities. (Full disclosure: I'm currently developing a case-based course on the history of American democracy, which I hope will help serve this role.)

Business leaders could certainly help push this agenda along as well. A number are already speaking out about the critical importance of improving reading, writing, math, and science skills in primary and secondary education. The fact that we're at or below the median on international tests is almost unforgivable in a country that helped invent public education. But I want to emphasize that while skill-building is enormously important, it shouldn't be the only objective as we think about educational reform. One principal reason for creating public schools in America in the nineteenth century was to help ensure and develop a capable electorate. So as we imagine new ways to strengthen our educational system, we shouldn't lose sight of how important it is to foster good citizenship and to deepen understanding of the democracy and its history. Thoughtful business leaders could certainly play a valuable role in reminding us of this.

Too often, I'm afraid, the health of the political system is seen as someone else's problem—not appropriate for the CEO to be worrying about. But when Harvard Business School alumni tell us that the biggest problem with the American business environment is the political system, that should make things abundantly clear. It is absolutely in the interest of American business to help ensure a strong and healthy culture of democracy in the United States. CEOs and other business leaders could make a difference—they could help strengthen the political commons—by making clear to their stakeholders and to the broader public that a healthy political environment is vital to a healthy business environment and a healthy economy, and that treating politics as war (however attractive in the short run) is a sure-fire way to weaken the political system (and the economy) in the long run. If we are going to strengthen and revitalize our democracy, all of us—including the nation's business leaders—have an important role to play in making this happen.

VITA

Warren Brookes

Brief life of a "pneumatic" journalist: 1929-1991

by CHARLES G. KELS

In an address at Moscow State University, President Ronald Reagan described how information technology was rapidly transforming industrial societies. As if from "a chrysalis," the world was emerging from a reality constrained by "physical resources into, as one economist titled his book, 'the economy in mind,' in which there are no bounds on human imagination and the freedom to create is the most precious natural resource." That remark may have disappointed Warren Brookes '50 slightly: he had noted in its preface that *The Economy in Mind* (1982) was "the work not of an economist but of a journalist." But in a larger sense, the presidential reference was a fitting tribute to a life spent extolling the virtues of free markets and the potential of innovation.

Unflinching faith in the capacity of human ingenuity to overcome scarcity was the key theme animating Brookes's works. His optimism was undergirded by a specific conception of wealth as "less physical and arithmetical than metaphysical and conceptual," grounded in "energy of mind" rather than "entropy of matter." He relished confronting "doomsdayers" and "gloom-mongers" who decried unsustainable growth. The real "gross domestic product," he wrote, is less dependent on market value than on "the value systems of our people." The creativity that sees silicon in sand and fiber optics in glass is a function of the "spiritual laws" that "give mankind the power to triumph over material lack and limitation."

Brookes came to journalism indirectly, having worked primarily in marketing until his mid forties. As a Cryovac executive, he helped pioneer the mass application of "saran-type plastic packaging," both reducing cost (meat could be pre-cut, boxed, and preserved at the packing plant) and increasing shelf life.

He ventured into publishing in the early 1960s, as the *Christian Science Monitor*'s promotions director. Despite success in boosting the paper's circulation, his belief that the *Monitor* should regain its core audience by emphasizing church principles led to a protracted, ultimately losing, struggle with the publication's leadership.

What happened next is not fully clear, largely because Brookes declined to discuss it publicly. He seems to have suffered an acute period of demoralization, and credited his wife with saving his life.

The episode proved transformative, launching his second career as a columnist who applied lessons from two decades in business to questions of political economy. In 1975, a friend at the *Boston Herald-American* asked Brookes to prepare a memo for the paper's economics reporters. The resulting "magnificent article" ran by itself and the *Herald* eventually gave Brookes a regular column, emphasizing the "taxpayer's" perspective. When California's Proposition 13 rolled back taxes in 1978, Brookes advocated a similar measure in Massachusetts. The paper received roughly 16,000 letters and Brookes became known as the architect of Proposition 2½, the 1980 referendum that capped Bay State municipalities' property tax revenue at 2.5 percent of value and limited increases to 2.5 percent a year. Brookes forecast an "exhilarative" economic effect, along with soaring property values that would blunt the revenue impact. His accuracy can be debated, but the fiscal Armageddon augured by some commentators never materialized, and even many original opponents now deem the measure a "qualified success."

In 1985, the *Detroit News* hired Brookes as its Washington columnist. He settled an hour outside the capital in a conscious effort to avoid coziness with officialdom. His commute, he joked, was "a perfect excuse for begging off the Washington social whirl" when his business there was done.

His rural location also suited the way he worked: "stay in [the] office and absorb the statistical data, then call up the experts about it." Rigorously, he compiled and analyzed data from recondite sources; tables and graphs were hallmarks of his columns. What set him apart was never his style—the tactfulness of a "pneumatic hammer," said one critic—but his persistence in unearthing inconvenient facts and in challenging conventional wisdom.

Brookes's reverence for entrepreneurialism coincided with the rise of Reaganomics and positioned him as an outspoken fount of supply-side policies. Not all were enamored: "He starts with funny

Courtesy of the Ronald Reagan Library

figures…and comes out with funnier figures still," said Massachusetts governor Michael Dukakis. Fiercely and admittedly ideological, Brookes could also train his sights on kindred targets, famously dismissing President George H.W. Bush as "all rudder and no keel."

Later in life, the man once described as "one of Boston's most read, and least seen, columnists" seemed to be inching closer to the limelight. He became an early star of the fledgling *Washington Times* editorial page and caught the attention of major news outlets. His sudden death from pneumonia at 62, just as his influence was peaking, devastated readers and friends.

Brookes was "ever the skeptic, but never the cynic," said one editor. His personal philosophy sprang from an abiding faith in humanity as the ultimate natural resource. In a 1977 exposé of Boston public housing, Brookes championed ownership rights for tenants as the antidote to high costs and squalid conditions. When Jack Kemp, confirmed as U.S. secretary of housing and urban development a dozen years later, asked him, "What should I do?" Brookes replied with his trademark guffaw, "Privatize it—but before you do, empower the poor." Eulogizing Brookes, Representative John Dingell mused that he was probably still churning out columns: "If Saint Peter tangles with him, he's going to be sorry."

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Ronald Reagan wrote in his presidential diary for September 12, 1988: "Then a briefing for a pleasant interview which took place at 1:30 with Warren Brooks [sic] my favorite Ec. columnist."

Architecture in Concert

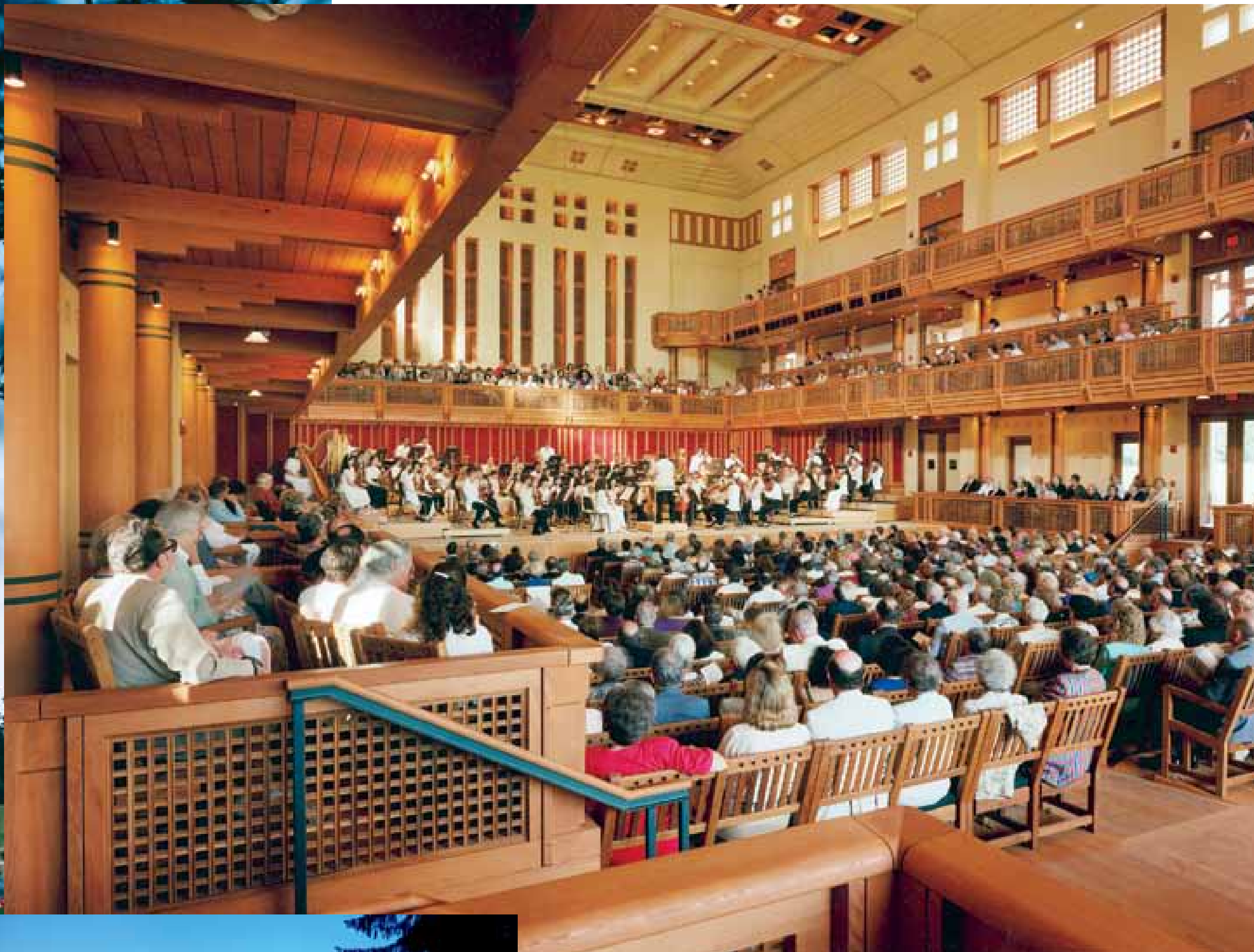
William Rawn's designs begin not with the eye, but the ear.

by CRAIG LAMBERT

The architectural competition is a venerable ritual. Held for important public buildings like the Houses of Parliament in London (in 1835), competitions solicit specific designs for a proposed structure on a defined site. The goal is to produce imaginative concepts, stimulate public discussion, publicize the building, and offer little-known talents a chance at a major project. Competitions have produced some important edifices: Brunelleschi's cathedral dome in Florence, for example.

Unfortunately, the results aren't always so exhilarating, nor so enduring. In 2003, for example, architect Daniel Libeskind's plan was chosen as winner of the World Trade Center Master Design Contest, after New York governor George Pataki overruled the Lower Manhattan Development Corporation, which announced the competition and had chosen a different winner. Complex negotiations with real-estate developer Larry Silverstein (who controlled the original World Trade Center towers) and others left most of Libeskind's master plan in place, but commercial and security interests weighed in heavily. Other architects have designed nearly all the structures on the site. Simply put, Libeskind's winning design was not built.

Part of the problem is that entering such competitions means designing a structure without consulting those who will use it—or building a relationship between architect and client or architect and community first. That's a core reason why the Boston architectural firm William Rawn Associates does not enter competitions: its principals have a radically different philosophy of how to create public spaces. "Design begins with listening," says Bill Rawn, J.D. '69, the firm's founder. "We like to listen to a potential client as long as we can, learn who they are, what their aspirations



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Three views of Seiji Ozawa Hall at Tanglewood, the summer home of the Boston Symphony Orchestra, in Lenox, Massachusetts. The hall opened in 1994. Opposite: With the "barn door" open, picnickers enjoy a concert. Above: the interior during a performance. Left: at twilight

are—and to absorb the spirit of the place that they want to build."

Take one of their best-known works, Seiji Ozawa Hall at Tanglewood, the summer home of the Boston Symphony Orchestra (BSO) in Lenox, Massachusetts. In 1989 the BSO sent letters to 35 architectural firms—30 well established, five younger entries—describing the 1,200-seat concert hall it wanted to build: an acoustically superb venue for indoor performances that could also be opened to the surrounding lawn, where audiences picnic and listen. The orchestra ran an interview-based selection process; Rawn's firm, founded in 1983, was the only newcomer on the BSO committee's short list. After interviewing the six finalists, committee chair Frank Hatch '46 asked the 14 members to put their top two choices on slips of paper. Rawn was on all 14. "Had it been only *one* per slip," he says, "we might not have gotten the job."

Selected on July 22, 1989, the firm had five weeks "to live the life of Tanglewood, to soak in the place" before the season closed. For the rest of the summer, Rawn, his senior associate, Alan Joslin, their collaborator, Larry Kirkegaard '60, M.Arch. '64, a Chicago-based architect and acoustician, and a team from the Connecticut-based Theatre Projects Consultants spent three working days per week at Tanglewood, staying in the musicians' quarters. Rawn's firm chose to site the new hall not on the brow of the hill, which the original Tanglewood estate's mansion dominates, but back from the hillside, like the Koussevitzky Music Shed, another cherished concert venue there. "Tanglewood is a magical place," says Rawn, "and the magic of it is that these music buildings are the workday barns and stables of Tanglewood, just like it was a farm."

That December, Rawn went to Europe for three weeks—Zurich, Basel, Berlin, Utrecht, Amsterdam, Aldeburgh, in England, and other cities—to see and hear 14 concert halls of a size similar to Ozawa's projected 1,200 seats. In each venue, he explored, photographed, and measured dimensions—and then heard a concert, exercising ears cultivated at the BSO, where he has held

Left: William Rawn in front of the Cambridge Public Library's new main building, which opened in 2009. Above: the Alice Paul and David Kemp Residence Halls at Swarthmore

season tickets since 1977. He ended with the "best one, with the best architectural resolution of all," Vienna's Musikvereinssaal, built in 1870 and often cited as the world's acoustically finest concert hall. That gilded, oblong room has loge seats along the sides, "which is not common," Rawn says, "but they are the best seats in the house." Flying back, he "filled 40 or 50 pages of my sketchbook with a set of design solutions for how this hall might be organized."

Seiji Ozawa Hall opened in 1994. Its "shoebox" shape and barrel roof achieve the six-story volume needed for optimal sound. With no proscenium arch, the audience can connect directly with the performers. Loge seats abound; the two tiers of balconies encircling the room (some even behind the stage) have concertgoers facing each other as well as the musicians. Thick walls keep the bass notes inside: the structure is essentially a brick shell enclosing a wooden frame. Movable chairs of plantation teak give the seating an informal, garden-like feeling. For large concerts, a 50-foot-wide "barn door" at the rear opens, spilling the music out to as many as 2,000 more spectators on the gently sloping lawn.

One tribute to the hall's acoustics came from its namesake: after conducting with the barn door both open and closed, Seiji Ozawa declared he could hear no difference in the orchestra's sound. Another came in the 2004 book *Concert Halls and Opera Houses: Music, Acoustics, and Architecture* by acoustical engineer Leo Beranek, S.D. '40, which assessed the hall's acoustics. Beranek ranked Ozawa one of the two best concert halls built in the United States (and fourth best in the world) in the past 50 years—and the thirteenth-best hall ever built, anywhere.

The Rawn firm has designed numerous other arts venues, including the '62 Center for Theatre and Dance at Williams; the Studzinski Recital Hall at Bowdoin; the Exeter Music Building at Phillips Exeter Academy; the Green Music Center at Sonoma State University in California; and the Music Center at Strathmore in Bethesda, Maryland (the second home of the Baltimore Symphony Orchestra). "Our theater, music, and dance buildings are all about community, bringing people together," says Rawn. "It's not about listening to music on earphones at home—it's coming together with 1,200 others to enjoy a night of music that is also a night of being in the public realm."

The "public realm," and the way the built environment shapes the life that unfolds within it, lives at the heart of the firm's mission. (The firm even published a 2002 monograph on their oeuvre, with essays by Rawn, *Architecture for the Public Realm.*) Early in his career,

CLOCKWISE FROM UPPER LEFT: JIM HARRISON; AND ©ROBERT BENSON PHOTOGRAPHY (4)

> “We don’t *want* a signature. Architecture is not about exporting a brand.”

Rawn got what many young architects would consider a huge break: he was the architect designing his first real-world residence in *House,* by Tracy Kidder ’67, which took readers through the process of designing and building a single-family home in Amherst, Massachusetts. Ironically, Rawn didn’t want a lot of publicity about that commission “because I didn’t want to be doing houses all my life,” he declares. “I’m not interested in a house down a winding road in the middle of a forest that no one ever sees. I want to create buildings in the middle of a city, or a campus, that do something to make that city or campus better.”

In fact, about two-thirds of the firm’s work now involves campuses, including dormitories at Amherst and Swarthmore, a music building at the University of Virginia, a campus police station at Yale, a lacrosse center at Johns Hopkins, and many others. “Campuses, of course, are about education, meritocracy, and opportunity,” Rawn says, adding that their buildings aim to advance such values. “We try to celebrate and strengthen a populist spirit—democracy and community,” adds Douglas Johnston, M.Arch. ’87, a principal of the firm. “We use words like ‘accessibility’ a lot, and talk about the ‘welcoming’ nature of a building.’” This isn’t anthropomorphizing. Architectural forms have very real effects on human behavior, quite often intentionally so. The multiple broad doors of a cathedral, for example, invite entry by all children of God, while the narrow, labyrinthine passageways in the tombs of the Egyptian pharaohs discourage uninvited visitors. Open floor plans and transparent materials like glass create a shared, communal space, with a feeling of access, connection, and freedom; a forest of walls, as in a typical “cube farm” office, reinforces feelings of separation, isolation, and a loss of individuality. The massive imperial buildings of Vienna impress and intimidate; the Iroquois longhouse forges a community.

Three views of the ’62 Center for Theatre and Dance at Williams. Below, left to right: its CenterStage studio theatre, one of four performance venues; the front entrance; a class in the Dance Studio

William rawn associates now has such a high profile (in 2009, *Architect Magazine* ranked it the number-one firm in the nation) that it could easily grow much larger. Instead, the firm has chosen to remain small, with a staff of 55 in its sole office, in downtown Boston. Its third principal, in addition to Rawn and Johnston, is Clifford Gayley, M.Arch. ’89. Samuel Lasky, M.Arch. ’97, and Mark Oldham, M.Arch. ’04, are associate principals. They limit the number of projects they take on—ideally, Johnston says, only about six in active design at one time. Staying small allows the firm to do things like send a team to camp out at Tanglewood for weeks. “If we were all about growth,” Johnston says, “we couldn’t spend that amount of time learning a client’s needs.”

The firm calls its style “contemporary modernism,” an heir to the International style of the twentieth century: clean, simple lines and plentiful glass on the exteriors. Yet inside, the feel is softened by abundant natural light and warm materials like wood and natural stone. “Many campuses put up their first modern buildings in the 1960s and 1970s, and they were often universally hated,” says Gayley. “They felt cold, less open, and not very welcoming.” Yet “The best modern buildings,” Rawn declares, “have humanity and warmth.”

Though the firm remains committed to an uncluttered, minimalist aesthetic, “We don’t have a signature, and we don’t *want* a signature,” Gayley says. “Architecture is not about exporting a brand. It’s about discovery—collaborating with the client to discover something unique.” For example, the dormitories they built at Amherst and Swarthmore look radically different—for one thing, Swarthmore, with its Quaker roots, has characteristically erected buildings around three-sided courtyards, with the fourth side open to the campus landscape; the Rawn group identified this pattern and applied it to their residence hall there.

In Rawn’s words, “patterns of place” help explain this; he likes structures that resonate with both their purpose and their setting. His twentieth-century architectural hero is Louis I. Kahn. “Every building of Kahn’s is shaped around an idea,” he explains. “He makes the form work with that idea—the forms *stand* on the land.” For example, Kahn’s celebrated Salk Center in La Jolla, California, which overlooks the Pacific Ocean, sits atop

a plinth. "Most of our buildings sit ever so slightly proud of the landscape," Rawn says.

The sense of place goes far beyond site and function. "We believe that for most places, rigorous study will enable you to elicit a set of planning principles that determined how it got to look the way it does," Rawn explains. "If you respect these principles, your building will fit into its setting. Then you have a wonderful freedom to design it the way you want."

For example, the north side of the main street of Williamstown, Massachusetts, forms a public edge of the campus of Williams College. A series of college buildings all have their narrower sides facing the street. Rawn and his colleagues noted this pattern—this "planning principle"—and oriented their '62 Center for Theatre and Dance with its narrow face toward the street as well. "A long, flat-faced building there would have been a dud," he declares. What they built is no dud. Writing on self-consciously "iconic" buildings for the *Wall Street Journal* in 2008, architecture critic Witold Rybczynski described the performance center as "…a nuanced composition of glass, brick, limestone, and wood that feels vaguely Scandinavian. While iconic buildings stand apart, the Williams theater and dance center is visually connected to its surroundings, contributing to a broader sense of place."

Tata Hall, a $100-million classroom building and executive-education residence at Harvard Business School (HBS) scheduled to open in the fall of 2013, occupies a different kind of place: its defining border is the Charles River. In 1927, early in the business school's history, the famous architectural firm McKim, Mead, and White drew up a plan with "arced roads and buildings laid out following the curves of the river, where the campus has its public face," Rawn explains. Several stucco structures dot the campus, interspersed among the red brick Georgian buildings. "If it was all brick, it would be deadly," he says, "but those stucco buildings give it enough of a spark." Though his firm's Tata Hall is unabashedly modern, it has a curved façade facing the river and an outdoor quad whose dimensions are nearly the same as the spaces in the 1927 plan.

The harmonious arrangement of the HBS campus and its well-considered early layout make it easier to identify the underlying planning principles. But at some institutions, "over time, the campus gets helter-skelter," Rawn says. "It can be hard to find the prevailing wisdom organizing the buildings, sometimes after many years of mistakes."

Below, left to right: the interior of Temple Beth Elohim in Wellesley, Massachusetts, looking onto a wooded landscape; the temple's exterior; Columbus Fire Station No. 6 in Columbus, Indiana

A CIVIC BUILDING near the edge of the Harvard campus, the Cambridge Public Library (CPL), illustrates how architectural spaces embody community values and shape social patterns. The project began in 1995 as a plan to add a building alongside the 1888 main library; Rawn's firm got the job. But then the city decided to consider other sites and spent a decade doing so before returning to the original scheme in 2004. Rawn's group again won the job, this time teaming with Ann Beha, a 1988 Loeb Fellow at the Graduate School of Design (GSD). Ann Beha Architects handled the restoration and reconstruction of the original library while the Rawn group designed the adjoining new, modern library (containing 76,700 square feet of space, compared with 27,200 in the original). Including its 37,700-square-foot underground parking garage, the entire project came in at $90 million. It opened in 2009 to wide acclaim, with longtime *Boston Globe* architecture critic Robert Campbell '58, M.Arch. '67, declaring it "one of the best recent pieces of architecture in the Boston area." In a written comment, Campbell adds, "The library is an example of Rawn's rare ability to create architecture that bridges taste cultures that are often at war with each other. People who admire the avant-garde and those who prefer tradition both usually feel comfortable with his humane, user-friendly designs."

The CPL's director of libraries, Susan Flannery, who saw the project through with Rawn and Beha,

Left: Principals Clifford Gayley, Douglas Johnston, and Rawn discuss a model in their office. Clockwise from above: the Green Music Center at Sonoma State University; the Music Center at Strathmore in Bethesda, Maryland; the University of Virginia's Marching Band Rehearsal Hall

CLOCKWISE FROM TOP LEFT: JIM HARRISON; ©DAVID WAKELY; ©ALAN KARCHMER; BALTHAZAR KORAB COURTESY OF THE LIBRARY OF CONGRESS; AND ©BRUCE MARTIN

remembers telling Rawn at the outset that she had only three nonnegotiable demands: that users would see books on entering the library, that the children's room would not be in the basement, and that the windows could be opened.

Consider these in reverse order. Operable windows dissolve a barrier between indoors and outdoors: open windows let air and sound flow both ways. Doing this reinforced a theme Rawn's firm established for the building, placed beside its predecessor, both giving onto a city park. (The idea of a "library in a park" was a planning principle traceable to 1888, and the new library's glass façade invokes transparency literally and figuratively, letting those in the park and those in the library see what the others are doing.) Working windows also enable library users to change its climate, a sort of architectural populism. Buildings with permanently sealed windows reflect a top-down control mentality that imposes the architect's decision—and dependency on an energy-consuming HVAC (heat, ventilation, and air conditioning) system—on the inhabitants. The library also has a double-skinned glass wall (its panels are three feet apart) that achieves high energy efficiency.

Unlike many public libraries, which ghettoize youngsters in basements ("About 90 percent of public libraries put their children's rooms in the basement, or on the first floor adjacent to an outdoor space," Rawn says), the CPL welcomes children to its topmost (third) floor. The warmly carpeted and furnished children's room there—typically flanked by a flotilla of strollers—makes a spatial statement that kids are first-class citizens in this world of books and stories.

Flannery's requirement for instantly visible books emerged from a visit she made years ago to the Harold Washington Library Center in Chicago, a widely lauded downtown structure (built following a design competition) that opened in 1991. "When I walked into the library, there was not a book to be seen," she recalls. "I was astonished to find that the entrance to the main library was on the *third floor!* Imagine any retail company being set up that way." At CPL, hundreds of books leap into view as one enters from the park: "It's a place for the book, for reading and learning," Rawn says. "On one level, that seems obvious; on another level, we didn't want this library to be dominated by community rooms and function rooms, as often happens."

"It's also a challenge to the notion that libraries will be made obsolete by technology," adds Gayley. "In fact, the book is still important, while technology is becoming a vital part of what libraries offer." (CPL has more than 100 publicly accessible computers, which Gayley calls "another economic equalizer that a library provides.")

Rawn grew up in San Marino, east of Los Angeles. The family also had a house at Long Beach, imprinting the boy with a lifelong love of walking on the beach, which he now does most weekends in Provincetown with his partner of 25 years, John Douhan '80, Ph.D. '96, an immunological researcher. As a boy, Rawn "designed a thousand beach houses" and drew plans for whole cities on bed sheets, but when he was 16, his father, a successful businessman, sat him down and told him all the reasons he shouldn't be an architect. The tall teenager (he is now six feet eight) played high-school basketball but eventually faced the fact that he had "mediocre athletic skills." At Yale, he majored in political science and graduated in 1965. He also subscribed to *Architectural Forum* and took a formative course with Vincent Scully, now Yale's Sterling Professor emeritus of the history of art: "He opened my eyes to the intellectual and cultural bases of architecture."

Law school at Harvard followed. "That was heady stuff, to be at Harvard in the late Sixties," he recalls. "It has affected my life ever since. Deep in my soul is a concern with doing something broader than myself, and making the world a better place." Rawn also took three studio courses at the Carpenter Center for Visual Arts

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with full law-school credit, including a three-dimensional design course with Will Reimann, a longtime senior preceptor in visual and environmental studies. Harvard, Rawn says, "kept propelling me and gave me a hint of my future life as an artist."

After spending two years (from 1969 to 1971) with a Washington, D.C., law firm, Rawn took nine months off to ski in Aspen and ponder his future. That interlude included six months of making silk-screen prints seven days a week ("I worked my tail off, like a true Type-A personality") at the Anderson Ranch Arts Center in 1971. (New York's Pace Gallery sold his works from 1975 until 1985.)

In 1972, back in Boston, he continued silk-screening at Harvard's Sever Hall basement studio while working full time as a staff assistant to Robert Wood, M.B.A. '48, Ph.D. '50, president of the University of Massachusetts. Five months before the university moved its Boston campus from downtown to Dorchester in 1973, Wood appointed Rawn assistant chancellor of the University of Massachusetts, Boston.

Half his job was physical planning, the other half community relations—dealing with organized community groups and "getting to know everyone in Dorchester." Some groups were sitting in, blocking trucks at the Columbia Point campus. It was a tense time for town-gown relations; Boston's school-busing crisis was in full swing, and "People in South Boston were not interested in having academics tell them what to do," Rawn recalls. "I put my heart and soul into it. I learned that community groups certainly know a lot about what is in their best interest. I admire them. Certainly, in our practice, we listen to the community very carefully. The same holds for faculty groups: if you don't listen to them, it's at your peril." As a university administrator, Rawn absorbed another lasting lesson: "I learned that universities don't speak with one voice."

His career began to take shape. At 28, he had a moment of epiphany while standing on the stairs in Harvard's Gund Hall with an architect friend, overlooking the tiers of student desks: "I stood there and said, 'I want to do this.' " He applied, and was admitted, to six architecture programs in 1975. He chose MIT over Harvard because "the GSD was in real turmoil in 1975 and MIT seemed more stable. Harvard righted itself quickly by the late 1970s and became a lively place." (Since 1996, Rawn has served on the GSD's visiting committee; he taught studio courses there in the 1990s.)

In 1979, with his architecture degree in hand, Rawn joined Davis Brody Architects (now Davis Brody Bond) in New York City and stayed four years before returning to Boston to launch his own firm in 1983. "Lew Davis was a wonderful mentor," he says. "He showed me that an architect could lead a civic life, could be active in city affairs and exceedingly well informed about them—in fact, that was an appropriate role for an architect." Rawn has hewed to that model closely. In 1989, he joined the Boston Civic Design Commission (he is the sole founding member still aboard), a group that advises the Boston Redevelopment Authority on design, reviewing proposed building projects for their environmental, aesthetic, and civic impact on the city. In 2010, he was inducted by the American Academy of Arts and Sciences. "Architecture is a public art," he declares, "and once it is built, it has to stand up not only to rain and wind, but to everyone's judgment."

In the Rawn office, architects deconstruct and reconstruct future building designs. (It's a stable group: Johnston has been a principal there since 1987, Galey since 1989.) Building scale models, even early in the design process, is their standard practice: models provide a three-dimensionality and a feeling for relative

Views of the main library in Cambridge, Massachusetts. Clockwise from left: The main entrance fronts directly on a park, like many public libraries. A double-skinned glass wall achieves year-round energy efficiency. On the ground floor, patrons see books as soon as they enter.

scale that elevations or beautifully rendered plans on computer screens cannot. In a way, a design meeting like a recent gathering of Rawn, Gayley, and architect Betsy Farrell Garcia, focused on a predesign study for a Tulane University residence/dining hall complex, resembles sophisticated play with blocks, as the architects stack, re-stack, and move around the small wooden oblongs and cubes of their model on the site, with everything made to scale. The firm has a "No Elmer's Glue" rule: "Nothing is stuck together that well," says Gayley, "so we can pop models apart and move walls around as we talk."

"Models are a wonderful way to communicate with clients," Johnston adds. "A lot of people don't read floor plans very well. Many are intimidated—or deceived—by computer renderings." Gayley notes that, "with models, clients aren't getting these glazed expressions and trying to guess what the right answer is." Many of the firm's young model builders are students in Northeastern University's co-op program, getting a real taste of the profession as practiced. "If they love model building, they're going to love architecture," says Rawn. "And if they don't, there's something wrong—they're choosing the wrong field. Most all of us [here] have always loved models, whether it was LEGOs, blocks, train sets, or tree houses."

Today the three architects are tearing apart their own ideas for the residence/dining hall complex. "My idea of a fence is a crummy idea," Rawn declares. "A really crummy idea." They look at pedestrians' sight lines across the quad, and consider how different placements of masses affect them. "There's a sense of invitation," Gayley notes, of one arrangement, "and a view corridor into the quad." Their working scheme places a second-story outdoor deck atop the dining hall, overlooking a grassy quad, where students, says Garcia, "can converse off the balcony with their friends throwing Frisbees down below."

Imaginatively, at least, the architects are throwing Frisbees themselves on a sunny college day in New Orleans, living in the building they are creating before it exists. Those tiny edifices are only two inches tall now, but a few years hence, five- and six-foot-tall sophomores will be eating and sleeping inside them. The Frisbees will be real.

HM

Visit harvardmag.com/extras to to watch Rawn discussing "patterns of place" and their application to his design for the Cambridge Public Library.

You could easily feel a swell of almost divine power at that thought, but the Rawn team has a way of keeping it in perspective. The scale model, for example, includes some live oak trees, which they are including in their design. "Some southern oak trees live twice as long as buildings, which might last only 50 years—these oaks are more than 100," Gayley muses. "Buildings come and go. But the trees are here for the long haul."

Craig A. Lambert '69, Ph.D. '78, is deputy editor of this magazine.

Reinventing the Classroom

Anatomy of a new course—and a new approach to teaching it | by HARRY LEWIS

At a time of rising interest in new forms of teaching to effect greater learning, Harvard Magazine *asked Harry Lewis, Gordon McKay professor of computer science, to recount how he rethought his—and his students'—roles in creating a new course, and what he learned from teaching it.* —The Editors

Computer science is booming at Harvard (and across the country). The number of concentrators has nearly tripled in five years. For decades, most of our students have been converts; barely a third of recent CS graduates intended to study the field when they applied to college. But sometime in 2010, we realized that this boom was different from those of earlier years, when many of our students came to computer science from mathematics, physics, and engineering. Today many seem to be coming from the life sciences, social sciences, and humanities. Never having studied formal mathematics, these students were struggling in our mathematically demanding courses. Their calculus and linear algebra courses did not teach them the math that is used to reason about computer programs: logic, proofs, probability, and counting (figuring out how many poker hands have two pairs, for example). Without these tools they could become good computer programmers, but they couldn't become computer *scientists* at all. It was time to create a new course to fill in the background.

I've developed big courses like CS 50, our introduction to the field. Courses for specialists, like CS 121 ("Introduction to the Theory of Computation") and CS 124 ("Data Structures and Algorithms"), the theory courses in the CS concentration. A lecture course mixing math and public policy—my "Bits" course, part of the Core and General Education curricula. Even a freshman seminar for 12, outside my professional expertise: on amateur athletics—really a social history of sports in America, heavily laced with Harvardiana.

So I figured I knew how to create courses. They always come out well—at least by the standard that I can't possibly do a worse job than the previous instructor!

This time was different. Figuring out the right topics was the easy part. I polled faculty about their upper-level courses and asked them what math they wished their students knew. I looked at the websites of courses at competing institutions, and called some former students who teach those courses to get the real story. (College courses are no more likely to work as advertised than anything else described in a catalog.) Thus was born CS 20, "Discrete Mathematics for Computer Science."

Photographs by Eliza Grinnell

But once I knew *what* I needed to teach, I started worrying.

Every good course I have ever taught (or taken, for that matter) had a narrative. CS 121 is the story of computability, a century-long intellectual history as well as a beautiful suite of mathematical results. "Bits" is the drama of information freedom, the liberation of ideas from the physical media used to store and convey them (see "Study Card," September-October 2011, page 58). CS 20, on the other hand, risked being more like therapy—so many treatments of this followed by so many doses of that, all nauseating. "It's good for you" is not a winning premise for a course.

And what if students did not show up for class? I had no desire to develop another set of finely crafted slides to be delivered to another near-empty lecture hall.

I'll accept the blame for the declining attendance. My classes are generally video-recorded for an Extension School audience. I believe that if the videos exist, then all my students should have them—and they should have my handouts too. In fact, I think I should share as much of these materials with the world as Harvard's business interests permit. I could think of ways to force students to show up (not posting my slide decks, or administering unannounced quizzes, for example). But those would be tricks, devices to evade the truth: the digital explosion has changed higher education. In the digital world, there is no longer any reason to use class time to transfer the notes of the instructor to the notes of the student (without passing through the brain of either, as Mark Twain quipped). Instead, I should use the classroom differently.

So I decided to change the bargain with my students. Attendance would be mandatory. Homework would be daily. There would be a reading assignment for every class. But when they got to class, they would talk to *each other* instead of listening to *me.* In class, I would become a coach helping students practice rather than an oracle spouting truths. We would "flip the classroom," as they say: students would prepare for class in their rooms, and would spend their classroom time doing what we usually call "homework"—solving problems.

And they would solve problems collaboratively, sitting around tables in small groups. Students would learn to learn from each other, and the professor would stop acting as though his job was to train people to sit alone and think until they came up with answers. A principal objective of the course would be not just to teach the material but to persuade these budding computer scientists that they *could* learn it. It had to be a drawing-in course, a confidence-building course, not a weeding-out course.

Opposite (clockwise from left): Denver Ogaro, Naomi Wills, Jun Sup Lee, undergraduate course assistant Ben Adlam, and Raina Gandhi. This page: (top, from left) Harry Lewis, Ali Nahm, and Julia Carvalho; (bottom) the renovated classroom

I immediately ran into one daunting obstacle: there was no place to teach such a course. Every classroom big enough to hold 40 or 50 students was set up on the amphitheater plan perfected in Greece 2,500 years ago. Optimal for a performer addressing an audience; *pessimal,* as computer scientists would say, for students arguing with each other. The School of Engineering and Applied Sciences (SEAS) had not a single big space with a flat floor and doors that could be closed.

Several other SEAS professors also wanted to experiment with their teaching styles, and in the fall of 2011 we started talking about designs. In remarkably short order by Harvard standards, SEAS made a dramatic decision. It would convert some underutilized library space on the third floor of Pierce Hall to a flat-floor classroom. In this prototype there would be minimal technology, just a projection system. Thanks to some heroic work by architects and engineers, the whole job was done between the end of classes in December and the start of classes in late January 2012.

The space is bright, open, and intentionally low-tech. The room features lots of whiteboards, some fixed to the walls and others rolling on casters, and small paisley-shaped tables, easily rearranged to accommodate two, four, or six seats. Electric cables run underneath a raised floor and emerge here and there like hydras, sprouting multiple sockets for student laptops, which never seem to have working batteries. A few indispensable accouterments were needed—lots of wireless Internet connectivity; push-of-a-button shades to cover the spectacular skylight; and a guarantee from the building manager that the room would be restocked daily with working whiteboard markers.

About 40 brave souls showed up to be the guinea pigs in what I told them would be an experiment. To make the point about how the course would work, I gave on day one *not* the usual hour-long synopsis of the course and explanation of grading percentages, but a short substantial talk on the "pigeonhole principle": If every pigeon goes in a pigeonhole and there are more pigeons than pigeonholes, some pigeonhole must have at least two pigeons. I then handed out a problem for the tables to solve using that principle, right then and there: prove that if you pick any 10 points from the area of a 1 x 1 square, then some two of them must be separated by no more than $\frac{\sqrt{2}}{3}$. They got it, and they all came back for the next class, some with a friend or two. (Try it yourself—and remember, it helps to have someone else to work with!)

After a few fits and starts, the course fell into a rhythm. We met Mondays, Wednesdays, and Fridays from 10 to 11 A.M. The course material was divided into bite-sized chunks, one topic per day. For each topic I created a slide presentation, which was the basis for a 20-minute mini-lecture I recorded on my laptop while sitting at home. The video and the slides were posted on the course website by the end of a given class so students could view them at their convenience before the next class. I also assigned 10 to 20 pages of reading from relevant sources that were free online. (A standard text for this material costs $218.67, and I just couldn't ask students to spend that kind of money.) The students, in turn, had to answer some short questions online to prove they had done the reading and watched the video before showing up for class. Once in class, I worked one problem and then passed out copies of a sheet posing three or four others.

Students worked in groups of four around tables, and each table wrote its solution on a whiteboard. A teaching fellow (TF), generally a junior or senior concentrating in math or computer science, coached and coaxed, and when a table declared it had solved a problem, finally called on a student to explain and defend the group's solution. (This protocol provided an incentive for the members of a group to explain the solution to each other before one of them was called on.) At the end of the class, we posted the solutions to all the in-class problems, and also posted real homework problems, to be turned in at the beginning of the next class.

We took attendance, and we collected the homework submissions at the beginning of class, to make sure people showed up on time.

I had serious doubts about whether this protocol would actually work. Required attendance is countercultural at Harvard, as is daily homework to be submitted in class. And education requires the trust of the students. To learn anything, they have to believe the professors know what they are doing. I really didn't, though I had observed a master teacher, Albert Meyer '63, Ph.D. '72, MIT's

Left: Course assistant Ben Adlam works with Raina Gandhi. Below (from left): Conner Dalton, undergraduate course assistant Abiola Laniyonu, Christine A. Maroti, Ricky Liu, and Selena Kim

The course "niche is the 'class as context for active, engaging, useful, and fun problem-solving' (as opposed to '...sitting, listening, and being bored')."

Hitachi America professor of engineering, utilize this style with great skill.

There was also the choppiness, the lack of a dramatic story line for the whole course. I took the cheap way out of that problem—I threw in some personal war stories related to the material. How Bill Gates '77, LL.D. '07, as a sophomore, cracked a problem I gave him about counting pancake flips and published a paper about it called "Bounds for Sorting By Prefix Reversal." How Mark Zuckerberg '06 put me at the center of his prototype social-network graph (so pay attention to graph theory, students, you never know when it might come in handy!). With no camera on me, I used the intimacy of the classroom for topical gossip—including updates on the five varsity athletes taking the course, three of them on teams that won Ivy championships during the term.

Student feedback was gratifyingly positive. Anonymous responses to my questionnaire included "I've found this to be the most helpful teaching method at Harvard" and "Oh my goodness, the in-class problem-solving is beautiful! We need more of it." Even the negative comments were positive. One student said, "The TFs are great. Professor Lewis's teaching is not good....I find it more useful to...talk to the TFs than listen to his lectures." Fine, I thought to myself, I'll talk less. My TFs have always been better teachers than I am, anyway, and lots of them are top professors now, so this is par for the course. My favorite: "You might say the class is a kind of start-up, and that its niche is the 'class as context for active, engaging, useful, and fun problem-solving' (as opposed to 'class as context for sitting, listening, and being bored')." Yes! Discrete mathematics as entrepreneurial educational disruption!

WHAT have we learned from the whole CS 20 experiment? Thirty-three topic units were a lot to prepare—each includes a slide deck, a recorded lecture, a selection of readings, a set of in-class problems, and homework exercises. The trickiest part was coordinating the workflow and getting everything at the right difficulty level—manageable within our severe time constraints, but hard enough to be instructive. Fortunately, my head TF, Michael Gelbart, a Princeton grad and a Ph.D. candidate in biophysics, is an organizational and pedagogical genius. When our homework problems were too hard and students became collectively discouraged or angry, we pacified the class with an offering of cupcakes or doughnut holes. We kept the classroom noncompetitive—we gave the normal sorts of exams, but students were not graded on their in-class performance, provided they showed up. That created an atmosphere of trust and support, but in-class problem-solving is pedagogically inefficient: I could have "covered" a lot more material if I were lecturing rather than confronting, in every class, students' (mis)understanding of the material! Harvard's class schedule, which allots three class hours per week for every course, is an anachronism of the lecture era; for this course we really need more class time for practice, drill, and testing.

I relearned an old cultural lesson in a more international Harvard. Thirty-five years ago I learned the hard way never to assign an exam problem that required knowing the rules of baseball, because (who knew?) in most of the world children don't grow up talking about innings and batting averages. This year I learned (happily, this time, *before* I made up the final exam) that there are places where children aren't taught about hearts and diamonds, because card games are considered sinful.

I also responded to some familiar student objections. Having weathered storms of protest in 1995 over randomizing the Houses, I anticipated that students would prefer to pick their own tablemates, but (true to type) I decided that mixing up the groups would make for greater educational dynamism. It worked, but next time I will go one step further. I will re-scramble the groups halfway through the course, so everyone can exchange their newly acquired problem-solving strategies with new partners.

With a good set of recorded lectures and in-class problems now in hand, the class could be scaled pretty easily; we could offer multiple sections at different hours of the day, if we could get the classroom space and hire enough conscientious, articulate, mathematically mature undergraduate assistants. Fortunately, the Harvard student body includes a great many of the latter, and I owe a lot of thanks to those who assisted me this year—Ben Adlam, Paul Handorff, Abiola Laniyonu, and Rachel Zax—as well as to Albert Meyer and my colleague Paul Bamberg '63, senior lecturer on mathematics, who gave me good advice and course materials to adapt for CS 20.

Above (from left): Rishav Mukherji, Brooke Ashley Carter, Dakota Thomsen-Diggs, and undergraduate course assistant Paul Handorff. Right: Julia Carvalho and Abiola Laniyonu

I had the added satisfaction, as a longtime distance-education buff, of finding out that this experience could be replicated online. With the support of Henry Leitner, Ph.D. '82, associate dean in the Division of Continuing Education and senior lecturer in computer science, we tried, and seem to have succeeded. In CSci E-120, offered this spring through the Harvard Extension School, a group of adventurous students, physically spread out from California to England, replicated the CS 20 "active learning" experience. They watched the same lectures and did the same reading on their own time. They "met" together synchronously for three hours per week (in the early evening for some, and the early morning for others). Web conferencing software allowed them to form virtual "tables" of four students each. Each "table" collaborated to solve problems by text chatting and by scribbling on a shared virtual "whiteboard" using a tablet and stylus. My prize assistant, Deborah Abel '01, "wandered" among the rooms just as the teaching fellows were doing in the physical space of my Pierce Hall classroom.

HM

Visit harvardmag.com/extras to view additional images of students in Lewis's course.

Most of all, the course was for me an adventure in the co-evolution of education and technology—indeed, of life and technology. The excitement of computing created the demand for the course in the first place. The new teaching style was a response to the flood of digital content—and to my stubborn, libertarian refusal to dam it up. The course couldn't have been done without digital infrastructure—five years ago I could not have recorded videos, unassisted and on my own time, for students to watch on theirs. The distance version of the course is an exercise in cyber-mediated intercontinental collaboration. Yet in the Harvard College classroom, almost nothing is digital. It is all person-to-person-to-person, a cacophony of squeaky markers and chattering students, assistants, and professor, above which every now and then can be heard those most joyous words, "Oh! I get it now!"

The renovation of Pierce Hall 301, described above, was funded by a gift from Stephanie Connaughton '87 to support collaborative learning at Harvard.

Solution to the problem: Divide the 1 x 1 square into nine squares that are each $\frac{1}{3}$x$\frac{1}{3}$, three rows of three. By the pigeonhole principle, with 10 points in nine squares, some square must contain at least two of the points. The farthest apart two points can be in a $\frac{1}{3}$x$\frac{1}{3}$ square is the length of the diagonal, which is one-third the length of the diagonal of a 1 x 1 square, that is, one-third of $\sqrt{2}$.

JOHN HARVARD'S JOURNAL

Work Zone

That sound heard on campus this summer, after the post-Great Recession stillness, was of earth moving again—and steel being lifted and concrete poured, making Harvard modern.

The reconstruction of the Fogg Art Museum proceeded most visibly (progressing toward a 2014 reopening). The aerial view (1), in mid summer, shows the new structure being inserted into the Quincy Street façade; the frame has since been fitted with the angled supports for a sharply canted, glassed-in, rooftop crown in architect Renzo Piano's signature style. Scaffolding is now in place to enable exterior construction around the new structure. (Images 3 and 4 detail the work as seen from the Carpenter Center and Quincy Street, respectively.)

HM▶ Visit harvardmag.com/extras to view additional construction images.

Renovation of Old Quincy (2) appears much simpler, but it is the test for design and construction concepts underlying renovation of the undergraduate Houses, a multiyear, $1-billion-plus program (see page 65). Across the river, the curving lines of Tata Hall (7), Harvard Business School's new executive-education complex, took shape. (See page 46 for a profile of architect William Rawn.)

Public infrastructure investments advance University links to the community, too. Contractors stripped the Science Center plaza (6) to repair the waterproofing of the Cambridge Street tunnel beneath; when the job is done, Harvard will redesign the plaza to encourage social interactions and host performances, in time for Commencement 2013. And the Commonwealth's aggressive repair program has reached the Anderson Memorial Bridge (5). Traffic lanes and sidewalks are constricted—tailgaters be warned!

(1) AERIAL BY LESVANTS.COM; (2-6) JIM HARRISON; (7) STU ROSNER

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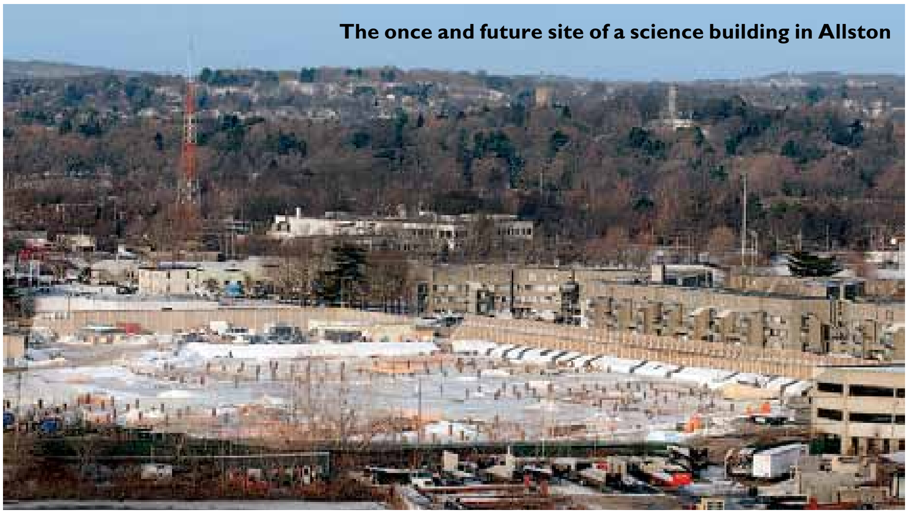
The once and future site of a science building in Allston

STU ROSNER

Allston's New Agenda

Harvard is preparing to resume construction of its science project in Allston, where work ceased in 2010 as a result of the financial crisis. Five hundred stem-cell scientists, bioengineers, and support staff will anchor a 500,000- to 600,000-square-foot health- and life-science center, associate vice president for public affairs and communications Kevin Casey told a June 13 meeting of the Harvard-Allston Task Force, adding that the University would like to start site preparation in late 2013 and begin construction in 2014.

Hewing to that schedule will depend on surmounting several hurdles: space planning for the prospective occupants of the complex; an architectural redesign; regulatory approval; and securing funding for what will likely be a multihundred-million-dollar project. (Since the financial crisis, Harvard has eschewed relying solely on debt for such projects; the Fogg Art Museum renovation, for instance, now under way, has been supported by substantial philanthropic gifts, and the science complex will seek donor support as part of the forthcoming University capital campaign—see below.)

The University also announced at the June meeting the selection of Samuels & Associates as a partner for the development of a mixed-use, residential-and-retail complex expected to house graduate students and faculty at Barry's Corner, the intersection of Western Avenue and North Harvard Street (south of Harvard Stadium and southwest of the Harvard Business School campus). The partnership brings Harvard expertise in creating such facilities, while transferring much of the financial burden for doing so away from the University. (Harvard has invested in acquiring the sites involved—near existing University service buildings that also will be redeveloped—but presumably will not have to finance construction of the residential-retail complex.) This mixed-use project, first outlined in June 2011 as part of Harvard's Allston Work Team recommendations, replaces the 2007 master plan vision for the site, which imagined significant investment in cultural facilities, such as museums and a performing-arts complex. By mid July, Elkus Manfredi Architects had outlined for the community plans including a six-story building with about 300 residential units and ground-floor retail space.

The announcements came less than nine months after the relocation of stem-cell researchers—part of the joint Medical School (HMS)-Faculty of Arts and Sciences (FAS) department of stem cell and regenerative biology (SCRB)—to the Sherman-Fairchild building in Cambridge, which was rehabbed for their research at a cost of $65 million to $70 million (see "Gut Renovation," November-December 2010, page 53). The Allston complex, when ready for occupancy, will presumably be able to accommodate growth in these research areas, enabling FAS to reclaim the renovated Sherman-Fairchild to house other life-sciences fields.

In a June letter, Harvard executive vice president Katie Lapp said that both the stem-cell and bioengineering programs planned for the new building—identified during a review process led by Provost Alan Garber—would have an educational component. (The building will include seminar rooms, classrooms, and undergraduate teaching laboratories.) In a separate statement, Xander University Professor Douglas Melton, co-chair of the SCRB department, noted that the co-location of stem-cell scientists and bioengineers "should lead to the kinds of collaborations and exciting advances, and interesting experiments in undergraduate teaching, that otherwise might not take place."

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A professor of prehistoric archaeology dates pottery in China to 20,000 years ago—10 millennia before the invention of agriculture.

harvardmag.com/pottery-12

The Berensons and Harvard

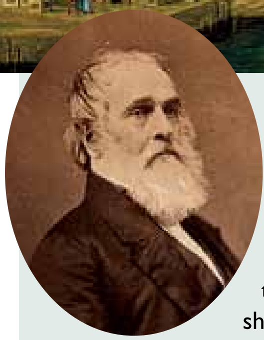
An online exhibit provides new insights into the art historians' time at the University.

harvardmag.com/berensons

HARVARD COLLEGE EUROPE PROGRAM; I TATTI/© 2012 THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE

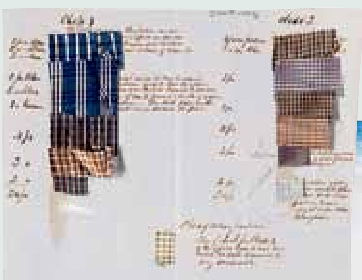
The China Trade

Far left and left: Tea production in China, c.1790-1800, and a receipt for textiles (from the Heard Family business records). Augustine Heard (left), of Ipswich, Massachusetts, built on his experience as a brig captain to found his own trading firm; below are silk samples, c.1850; the Heard Company flag; and the company's 700-ton steamship the *Fire Dart*, commissioned in 1859-1860 for the Yangtze River trade after the Second Opium War (it flies the Heard colors). Below: The merchant Hoqua, portrayed by George Chinnery, c.1830, amassed a $26-million fortune, placing him among the world's richest men.



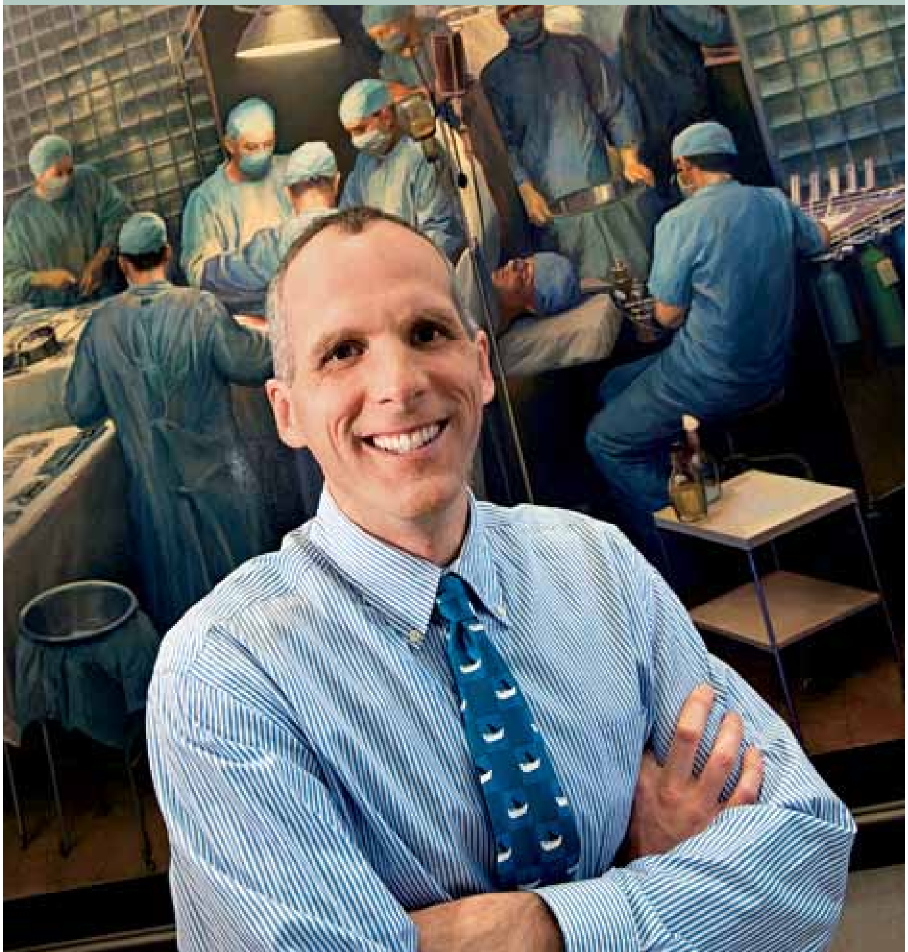
The earliest United States trade with China, it may be hard to remember, began just after independence from Great Britain. It initially involved such goods as tea and textiles, and amounted to tens of thousands of dollars, rather than trillions. The addictive good of the era, shamefully, was opium (a major component of Chinese imports), rather than the torrent of Apple consumer gadgets flowing outward today. Unlike the great European joint-stock enterprises—the Dutch East India Company and its British counterpart—the American traders were New England entrepreneurs who set up private firms or merchant syndicates.

A Chronicle of the China Trade, an elegant exhibit at Baker Library drawing on Harvard Business School's historical collections (through November 17, and online at www.library.hbs.edu/hc/heard), documents this commerce through the remarkable records of Augustine Heard & Co., from 1840 through 1877 (just one of the library's collections of such materials). The documentary evidence, complemented by American artifacts and materials on loan from Hong Kong and Shanghai, details the growth of the family business and the swelling volume of cotton, silk, porcelain, and other goods crossing the ocean. It explores rapid institutional change, from the Chinese system of limiting trading to licensed hong monopolies under imperial control, to the forced opening of so-called treaty ports (after the Opium Wars) and the rise of compradors who managed business as trading-house employees. It follows the spread of business from coastal enclaves into China's interior (a pattern repeated during the past three decades); the physical and social evolution of trade communities; the deployment of game-changing, speedy new technologies (clippers and steamships, antecedents to the modern cargo jet, and the telegraph); and the lubricating effects of new banking services, credit instruments—even (tea) crop futures. And yes, fortunes were made (and lost)—not only by the Heard enterprise but also by Chinese traders who proved utterly adept at business.



CLOCKWISE FROM TOP LEFT: PEABODY ESSEX MUSEUM (LANDSCAPE); BAKER LIBRARY HISTORICAL COLLECTIONS/ HARVARD BUSINESS SCHOOL (RECEIPT); ART RESOURCE/METROPOLITAN MUSEUM OF ART (PORTRAIT); IPSWICH MUSEUM (DRAWING, FLAG); BAKER LIBRARY HISTORICAL COLLECTIONS/ HARVARD BUSINESS SCHOOL (SILK SAMPLES, PHOTOGRAPH)

HARVARD PORTRAIT



David Jones

In college he was a varsity fencer with high-profile mentors: Simon Schama taught narrative history to Ackerman professor of the culture of medicine David S. Jones '92, M.D. '97, Ph.D. '01, and Steven Jay Gould advised his history and science honors thesis on Mount Vesuvius. But geological science frustrated him—"It was studying events you would never get to observe." Later, Cold War medical ethics captivated Jones when he studied human subjects injected with plutonium or exposed to nuclear test blasts in Nevada. Antibiotic research on the Navajo reservation in the 1950s looms large in his 2004 book (completed during his psychiatric residency), *Rationalizing Epidemics: Meanings and Uses of American Indian Mortality since 1600,* which illuminates the European-sourced epidemics that decimated the Native American population. Jones's current work explores the history of coronary-artery bypass surgery and the cycles of innovation/enthusiasm/disappointment that repeat when clinical trials fail to confirm initial expectations. While on the faculty of MIT's Program in Science, Technology, and Society, he began teaching at Harvard Medical School (HMS) in 2007; in 2011 he was named to the new Medical School/Arts and Sciences Ackerman professorship, with a mandate to create a program in culture and medicine. He teaches social medicine to HMS students and an undergraduate course on history and medical ethics. Jones and his wife, pediatrician Elizabeth Caronna, M.D. '97, live in Newton (where he jogs by the river) with their young son and daughter. They began dating during their microbiology class, but had first met in a medicine and literature course, which, he says, sounds "a bit more romantic."

Photograph by Jim Harrison

The bioengineering group will consist of faculty members from both the School of Engineering and Applied Sciences (SEAS) and FAS, including wet- and dry-lab experimentalists, as well as applied mathematicians and theorists. Lapp called it likely "that the Cambridge-shared platforms of the Wyss Institute for Biologically Inspired Engineering would be included in this move…." as well. (The Wyss Institute is based in the Longwood Medical Area, where HMS and its affiliated hospitals are located.) SEAS dean Cherry A. Murray emphasized in a press statement that "with strong connections to industry, startup companies of our students and faculty, the burgeoning Innovation Lab, and nearby Harvard Business School, we have a magnificent opportunity to build new technologies in critical areas like drug delivery, medical devices, smart materials, and tissue engineering." Other entities that make a clear contribution to advancing the science of the core groups, such as expertise in imaging—a key resource utilized by biologists and engineers at the forefront of science—might also be co-located in the building.

With a goal of completing a new, five-year institutional master plan for Allston by October, University representatives continued to meet with Allston residents at an accelerated pace every few weeks throughout the summer. Community feedback ranged from queries about whether Harvard really had the money to complete these projects, to assertions that it should not be allowed to proceed with any more projects—such as the housing and retail space at Barry's Corner—until the science facility is completed.

At the same time, Samuels & Associates, the development partner for the Barry's Corner project, won high praise from the two Allston Task Force members who served on the Harvard-led 10-person Real Estate Partner Selection Committee. They said the firm was community-focused and "paying attention."

Lapp wrote in her letter that the science-building project would be financed with "a mix of funding strategies including philanthropy." In December 2009, she had indicated that the University would look at a variety of possible funding opportunities, "including co-development with private partners or other institutional partners" for the science site, but so far, no mention has been made of such a partner.

Brevia

Online Education Race

edX, the Harvard-MIT online education joint venture announced in May (see "Harvard, Extended," July-August, page 46), welcomed the **University of California, Berkeley,** as a third teaching partner; it also brings online technology to the edX platform. The consortium (www.edx.org) plans to offer seven courses this fall: three from MIT (circuits and electronics; introductory computer science; solid-state chemistry), two from Berkeley (artificial intelligence; software), and two from Harvard (a version of the popular Computer Science 50 programming course; a public-health course on biostatistics). Humanities and social-sciences offerings, hinted at during the May announcement, are deferred until next year. The for-profit **Coursera** (www.coursera.org) enterprise, launched by Stanford, Princeton, Penn, and the University of Michigan, announced a dozen new partners (among them Duke, Caltech, Johns Hopkins, the University of Virginia, and the University of California, San Francisco) and 116 online courses in 16 fields, from life sciences and computing to the humanities.

Death: The TV Show

President Drew Faust's most recent book, *This Republic of Suffering: Death and the American Civil War* (excerpted in this magazine's January-February 2008 issue), has now been translated into a Ric Burns television special for the American Experience series. The two-hour documentary, *Death and the Civil War,* airs on September 18 at 8 P.M. Faust, who figures prominently in the film, plans to attend events for the program in Boston, New York, and possibly other cities.

The Simons Surprise

The Simons Foundation—founded by mathematician and hedge-fund manager **James Simons** and his wife, economist and philanthropist **Marilyn (Hawrys) Simons**—has conferred Simons Investigator grants on 21 academic mathematicians, theoretical physicists, and computer scientists, an initial round of five-year, $120,000 annual unrestricted grants much like MacArthur Foundation fellowships. Among those funded are professor of mathematics **Horng-Tzer Yau**, a probabilist and mathematical physicist, and **Michael P. Brenner**, Glover professor of applied mathematics and applied physics and area dean for applied mathematics in the School of Engineering and Applied Sciences. Brenner's work has engaged problems from fluid mechanics to the evolution of protein functions. The awards are renewable once. The foundation recently gave $60 million to **Berkeley** (James's doctoral alma mater) to create the Simons Institute for the Theory of Computing; $150 million to **Stony Brook University** (Marilyn's undergraduate and doctoral alma mater) for medical research, 35 faculty chairs, and student support; and $26.5 million to MIT (James's undergraduate alma mater; he is a member of the corporation) for autism research.

SOLAR EXPANSE: Have 1.5 acres of flat roof space, will go solar. Borrego Solar Systems installed 2,275 solar photovoltaic panels (Harvard's largest campus solar array) atop the Gordon Indoor Track and tennis complex, creating 591.5 kilowatts of clean-energy capacity. According to the University news release, the investment is expected to have a six- to 10-year payback.

Advancing Arts, Academically

As Harvard begins to bring art-making and performance into the curriculum (see **http://harvardmag.com/art-12**), other institutions continue to invest in these fields. **Dartmouth** alumnus Leon Black and his wife, Debra, have given $48 million for a new visual-arts center, opening in September; it will house the departments of studio art and of film and media studies, and a digital-humanities program, alongside the expanding Hopkins Center for the Arts and Hood Museum of Art. The new center includes classrooms, faculty offices, a gallery, a screening room, and an auditorium, plus studios and filmmaking spaces….The foundation of Yale alumnus James H. Binger recently gave the **Yale School of Drama** $18 million in operating support and an endowment for a center for new theater that will fund and stage new works.

On Other Campuses

MIT's Computer Science and Artificial Intelligence Laboratory has announced a "bigdata@CSAIL" initiative to focus research on enormous data sets requiring new processing technologies. Intel Corporation funded a five-year program, with an investment of up to $12.5 million, to investigate problems in medical, financial, social-media, security, and data-intensive fields….**New York University** has won city approval for its multidecade, multimillion-square-foot campus expansion plan in Greenwich Village….

Photograph by Jon Chase/Harvard News Office

Continuing a series of Ivy League changes in financial aid, **Cornell** has tightened its "no-loan" package; it now applies to entering undergraduates from families with incomes of $60,000 or less, compared to the previous $75,000 threshold.…Following New York's ventures with Cornell and NYU to enhance applied science and engineering in the city, it has pledged $15 million of support for **Columbia's** new Institute for Data Sciences and Engineering, which aims to hire at least 75 new faculty members during the next 15 years.

Art and Architecture, Engineering

The department of history of art and architecture and the Graduate School of Design will offer a new undergraduate track in **architectural studies**, beginning this fall. Students will be able to enroll in graduate-level courses in architecture history and theory, studio and design, and basic architectural techniques; if so inclined, they may pursue an architecture concentration, melding senior-year work with first-year GSD class requirements. Separately, the School of Engineering and Applied Sciences and the Graduate School of Arts and Sciences are offering a **master of science in computational science and engineering**, focusing on large-scale computation and mathematical modeling. For further information, see **http://harvardmag.com/art-architecture** and **http://harvardmag.com/applied-science**, respectively.

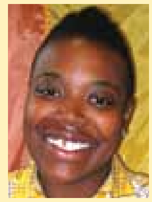
STEPHANIE MITCHELL/HARVARD NEWS OFFICE

Paul J. Barreira

Nota Bene

Director doctor. Psychiatrist **Paul J. Barreira** has been appointed director of Harvard University Health Services and Oliver professor of hygiene. He succeeds **David S. Rosenthal** '59, who is retiring, in both posts. As director of behavioral health and academic counseling at HUHS, Barreira has overseen student mental-health and alcohol and other drug services, sexual-assault prevention and response operations, and the Bureau of Study Counsel.

Organs on chips. The **Wyss Institute for Biologically Inspired Engineering** has entered into an agreement with the Defense Advanced Research Projects Agency, worth up to $37 million, to develop 10 human "organs on chips," linked together to mimic whole-body physiology, to accelerate testing of potential drugs without animal or other living-organism tests. The project leaders are Wyss director **Donald E. Ingber**, Folkman professor of vascular biology and professor of bioengineering, and **Kevin Kit Parker**, Tarr Family professor of bioengineering and applied physics.



COURTESY OF VANIDY M. BAILEY

Vanidy M. Bailey

BGLTQ director. Harvard College dean Evelynn M. Hammonds has appointed **Vanidy M. Bailey** as director of Bisexual, Gay, Lesbian, Transgender, and Queer student life. Bailey, who oversaw programs at the LGBT Resource Center at the University of California, San Diego, will be responsible for BGLTQ student and organization advising, programming, staff training, alumni relations, and policy, and will supervise the student-run Queer Resources Center.

KRIS SNIBBE/HARVARD NEWS OFFICE

Martin Puchner

World lit. **Martin Puchner**, Wien professor of drama and of English and comparative literature, is general editor of the multivolume, third edition of *The Norton Anthology of World Literature*. The recently published reference includes works ranging from European classics to Mayan and ancient Egyptian texts.

Miscellany. **Natasha Trethewey**, RI '01, a Radcliffe Institute Fellow six years before her collection, *Native Guard*, won the Pulitzer Prize in poetry, has been named poet laureate of the United States.…**Robert B. Zoellick**, M.P.P.-J.D. '81, who concluded his term as president of the World Bank on June 30, has become a senior fellow of the Harvard Kennedy School's Belfer Center for Science and International Affairs, and a visiting fellow at the Peterson Institute for International Economics, in Washington, D.C.…The list of new fellows of the American Academy of Arts and Sciences published in the July-August issue (page 51) inadvertently omitted **Robert H. Giles**, curator emeritus of the Nieman Foundation for Journalism and a director of Harvard Magazine Inc.

***Gilgamesh* on the grounds: Sculptor Dimitri Hadzi, who was professor of visual and environmental studies, is best known locally for *Omphalos*, the vertical granite work at the Harvard Square T station. Now his widow, Cynthia Hadzi, has donated *Gilgamesh* to the Harvard Mineralogical Museum, which has installed the work in a nearby courtyard—a welcome addition to a campus with relatively few works of outdoor public art.**

Photograph by Eva Bargias

Designating Dunster

Harvard announced in mid July that Dunster will become the first of its 12 residential undergraduate Houses to be fully renewed under an ambitious, multidecade program. (Renovating the River Houses alone is expected to cost more than $1 billion.) Faculty of Arts and Sciences (FAS) dean Michael D. Smith and Harvard College dean Evelynn M. Hammonds said that under the plan, which needs approval from the Harvard Corporation, Dunster—the smallest of the neo-Georgian Houses along the Charles—would be out of service for 15 months (one academic year and the bracketing summers) in order to complete the project. Work is slated to begin in June 2014.

Dunster residents would be housed temporarily at the Inn at Harvard and in nearby University-owned apartment buildings for the 2014-2015 academic year. The Inn, constructed in 1991, was built for use as a hotel until needed for other University purposes. It will close by July 2013 to be refitted with student beds, a dining hall, and other social and program spaces integral to every House.

Planning for the massive project of renewing the Houses began in 2007, when administrators noted that a system originally designed to accommodate 3,900 students was housing 4,900, forcing many undergraduates to live in suites' common rooms or in nearby apartments. A consulting firm hired to analyze the Houses noted that aging mechanical systems (including plumbing, ventilation, and electricity), most dating to the 1930s but some more than 100 years old, would need to be replaced. Planners also expect to address fire-safety issues and bathroom access that requires bedroom walkthroughs. Their goal is to use existing space more efficiently in order to house more students more sustainably.

Because the role of the Houses had not been thoroughly reexamined since the first seven were built during a three-year period in the

Yesterday's News

From the pages of the *Harvard Alumni Bulletin* and *Harvard Magazine*

1922 Professional waiters will be employed this year in the dining-room of the Harvard Union. For the past three years that work has been done by students, but the management believes the change will be economical. Breakfasts will cost 30 to 65 cents, luncheon, 65 cents, and dinner, 90 cents.

1932 Although the "business depression" prompts Harvard to allocate $40,000 for part-time jobs for 200 to 300 students, Herbert Hoover carries the College (1,211 votes) in the *Crimson*'s early presidential poll. The *Alumni Bulletin* attributes Norman Thomas's strong showing (484 to FDR's 620) to "an extraordinary increase of independent thinking among the students."

1937 Harvard receives a $764,114 bequest from Mrs. Lucius W. Nieman, widow of the publisher of the *Milwaukee Journal*, "to promote and elevate standards of journalism in the United States."

1942 The Fogg Museum sponsors a course in industrial and civilian camouflage…The Law School's enrollment drops from 1,500 to 165.

1952 Harvard begins the largest financial-aid program in its history, allocating almost $1 million in scholarships, loans, and jobs for more than one-third of the undergraduate body.

1972 The *Courses of Instruction* includes for the first time a course in Vietnamese.

1982 Allston Burr Hall is demolished to make room for an addition to the Fogg Art Museum amid a flurry of other construction activity, including the remodeling of Lowell and Winthrop Houses and the extension of the Red Line subway tunnel northward. "Everywhere one walked, progress was afoot," report the editors. "This was the summer of our discombobulation."

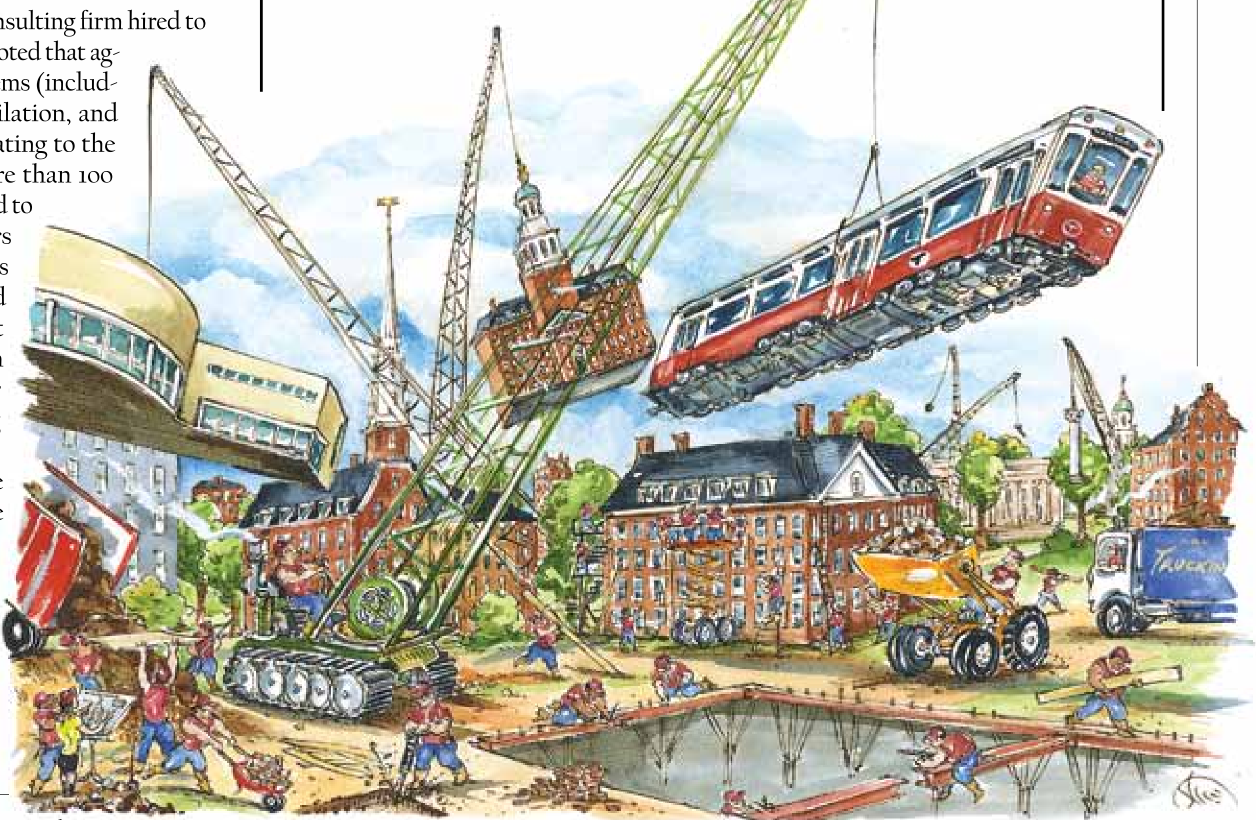


Illustration by Mark Steele

1930s, administrators also undertook an extensive review of that subject [see "What Makes (and Remakes) a House," July-August 2008, page 66], examining everything touching on the Houses' mission and purpose, ranging from academic and social matters to the responsibilities of masters, deans, tutors, staff, and senior common-room members, and the services and resources a House should provide. Committees reviewed public spaces such as libraries, technology labs, and recreational spaces to determine which are essential to every House and which might be shared among Houses.

Other groups considered how residential living spaces enhance students' learning, health, and well-being. Their recommendations were used to draft guidelines for the planning and architecture of the renovations, which ultimately led to a strategic and financial plan.

MARGARET MALONEY

"Our commitment to providing an unparalleled liberal arts education and student experience in a residential setting is unwavering," Smith stated in the official announcement about Dunster. Harvard, he said, will apply the lessons learned from the test projects at Old Quincy (under way) and Leverett House's McKinlock Hall (slated to begin next summer) as it begins planning for Dunster's renewal. Achieving that goal, in turn, will furnish FAS and the College with additional data before the renovation of a second House begins during 2016 and 2017.

THE UNDERGRADUATE

Summer Reflections

by CHERONE DUGGAN '14

Despite having spent countless hours on the Internet, there is only one Google search I distinctly remember making. One day, when I lived at home in Ireland, I was so utterly and completely fed up with school that I typed "summer abroad" into Google and pressed Enter. I was hoping that a beautiful montage of interesting language programs and exotic backpacking destinations would flood my computer screen, transporting me, if only momentarily, away from the gloomy Irish day and my debilitating boredom into a world of beautiful colors and accented whispers. No such montage materialized.

Instead, something quite different appeared as the first search result. I clicked it. I read. I thought about what I read. The program described sounded good. I applied. I went. I loved it. I returned home, grew more maddened by the Irish educational system, decided to leave it, and left. And, in leaving, changed the entire trajectory of my life.

The link I clicked that fateful day directed me to Harvard Summer School's Secondary School Program website. I clicked it toward the end of my sophomore year of high school—called "Transition Year" in Ireland, designed to allow students to take some time off from the humdrum curriculum in order to "personally develop." In my school, this "personal development" came only in very specific, structured packages, neatly wrapped and presented to us in the form of starting our own mini-companies, performing at an annual show, taking random classes in self-defense, drama, and first aid, selling charity badges to strangers on the streets of Dublin, and very little else that I can remember.

The general idea of the Year is for students to escape from the overly exam-focused system: in Ireland, our entire pre-collegiate education boils down to the preparation for, and results of, two sets of examinations—the first, when you're about 14, the second, at the very end of senior year. The results of the second set are the only criteria for college admissions. Everything else is just a test run; your whole secondary-school education comes down to two weeks of exams at the very end. No essays, no extracurriculars, no school transcripts, no recommendations—just making State Examination grades. The End is all that matters. You are merely an examination number, with no face and no background, just a

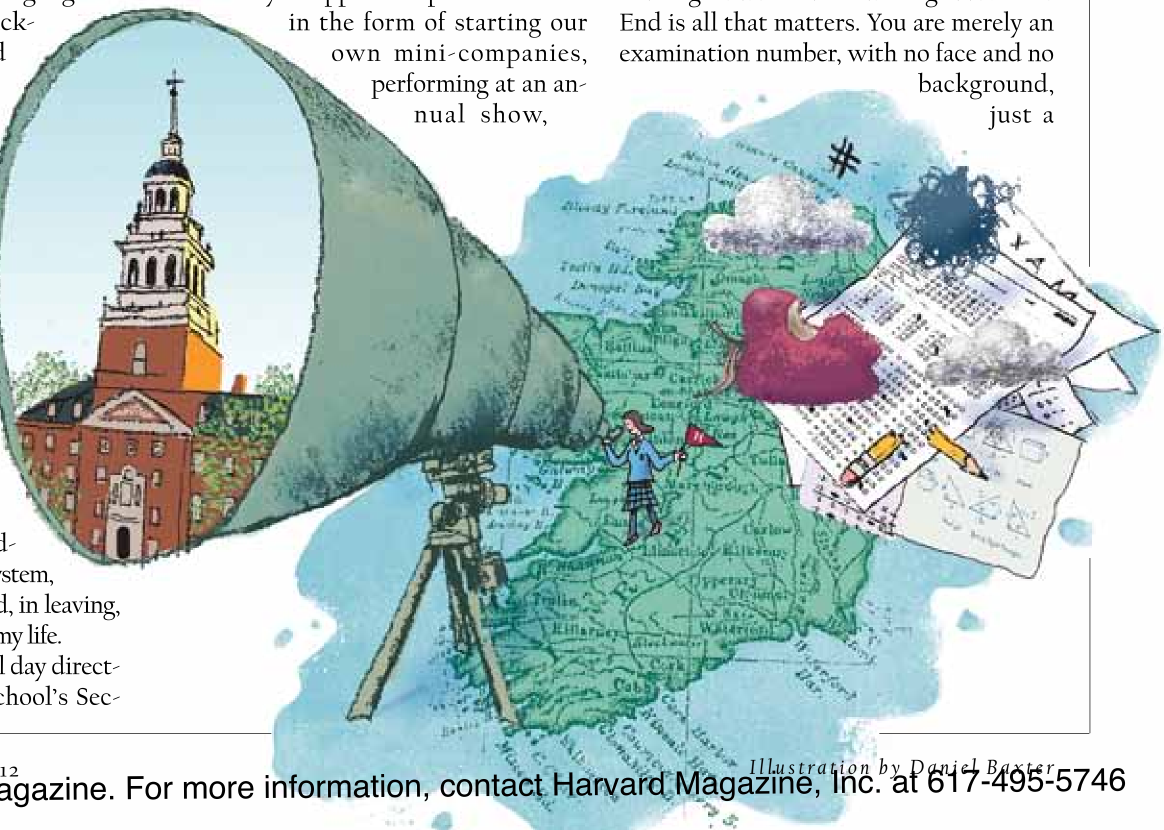


Illustration by Daniel Baxter

set of results; labeled test tubes in a clinical, sterile "learning" lab.

Transition Year is meant to set you free from this learning lobotomy. But, because all your new "explorative" classes are taught by the same teachers who teach toward state exams, the learning rubric does not change. The freedom we received was only technical—we were given computers with which to occupy the majority of our days. Classes mostly consisted of free time: free packaged presents. But really, the time was unfree: you couldn't be present in it at all, because you had to stay in class, aimlessly "researching" things on your computer, or mindlessly watching "educational" films. We had to stick with the constrained curriculum, in which the present never really lived—it only passed past us until the school bell rang, shrilly signaling the end of yet another regimented segment of time.

Because preparation for our judgment-day exams had been paused, motivation was generally lacking, or at least slacking, before we all hit junior year. This was hardly surprising: without the structure of preparing for our state exams, our education system has very little to fall back on—in fact, it means nothing at all. So, we were instructed to "personally grow" in a period that was structured into carefully partitioned "free time" that was constantly filled. We were given "freedom" that was both meaningless and endless.

To me, the whole notion seemed forced. Even so, Transition Year was obligatory: I was forced to be unfreely free. So, I took my freedom, at my expense, and made it pay, my way. And pay my way it did, for one of the most useful of all my personal developments in Transition year took place in my bank account. I worked double the number of hours I had worked since I started working when I was 12. And by the time I grew frustrated with the stagnation of all "developments" during the Year, I had saved enough money to leave transitioning, and Ireland. So that's exactly what I did. I made the most documented, and undocumented, of all Irish moves: I moved away.

I ARRIVED at Harvard for summer school with no knowledge of what to expect. I didn't know anything about the American college system, didn't know what liberal arts meant, had no notion of applying to schools here, and no family or friends in America to explain anything to me. All I had was the names of my two classes, a mind full of a deficit of interest, freshly harvested from Transition Year, and a bank account that was almost empty of four years of my time. Luckily, my post-transitioned mind was in the perfect state to be filled, and the bottled-up time I had been saving was perfectly spilled right back into my head—just like water raining back down into a mirroring sea. Classes, instead of being full of answers, were full of questions. And, for the first time, I discovered that I suited questions a lot better than I suited answers. My time, in being reflectively spent, was set free—in and of itself.

I returned home filled with difference—with different ways of thinking and different types of friends, with different words for different worlds. But this time, I had a weapon to fend off the straitjacketed system. I had knowledge that, somewhere, I could find an education of questions—a place where ceilings are only made of sky. This place wasn't Harvard, or America, even though Harvard was the first place I really found it. Instead, it's a state of mind—the only state in which I think any of us can be truly free, where legitimacy, because it lives in questions themselves, is unquestionable and, as such, is the most

New Fellows


Kathryn Reed and Cherone Duggan

Harvard Magazine's Berta Greenwald Ledecky Undergraduate Fellows for the 2012-2013 academic year will be Cherone Duggan '14 and Kathryn Reed '13—selected from among more than two dozen applicants. The fellows join the editorial staff and contribute to the magazine during the year, writing the "Undergraduate" column and reporting for print publication and harvardmagazine.com, among other responsibilities.

Duggan, of Carbury, County Kildare, Ireland (a small farming community about 30 miles west of Dublin), and Winthrop House, first came to Harvard as a summer-school student. For college, she was attracted to the opportunities for liberal-arts education, as opposed to the professional tracks that are prevalent on the other side of the Atlantic. At Harvard, she has served as a peer educator for the Office of Sexual Assault Prevention and Response, has volunteered with a Boston writing program for young adults and senior citizens, and has worked in Lamont Library. She was recently awarded a Mellon Mays Fellowship. A social-studies concentrator, Duggan was in Cambridge this past summer as a campus proctor for summer-school students.

Reed, of Windsor, Massachusetts (a small community in the Berkshires), and Adams House, is chair of *The Crimson's* weekly magazine, *Fifteen Minutes*, and has done distinguished work as both a writer and a photographer. She is also a dorm crew House captain. She has spent the past two summers in Tanzania on a Support for International Change program, living in a rural village and serving as an HIV/AIDS educator—in circumstances that are "the exact opposite of the Berkshires." Reed is concentrating in sociology with a secondary field in philosophy; she also expects to earn a language citation in Swahili.

The fellowships are supported by Jonathan J. Ledecky '79, M.B.A. '83, and named in honor of his mother. For updates on past Ledecky Fellows and links to their work, see http://harvardmagazine.com/donate/ledecky-fellowships.

Photograph by Stu Rosner

definite form of legitimacy there can be. It just clicked for me, and has been clicking ever since.

Now, as a rising junior, I'm a proctor for Harvard Summer School. I'm the primary question-answering resource for 13 rising high-school seniors. Each of them is older than I was when I first came here, one Transition Year old and completely clueless about all things American. They're full of questions—mostly about where classes are and what Harvard life is like. They all seem a lot harder working, and immensely less shy, than I was when I was where they are. They know a lot more about the college application process than I do, and seem a lot surer about what they want. I can answer some of their questions, though, and can show them where some things are and how some things work.

My favorite question I've been asked so far was asked of me on one of the very first days of the Summer School term. My co-proctor and I walked some students from our hall to dinner in Annenberg, where we sat together after navigating the still-confused crowd in the servery. I can't remember many details of the table conversation. But, I do remember looking down at my glass of water and seeing the reflection of the vaulted ceiling dancing across the liquid's surface. I looked up as one of my students, holding his own empty glass in his hand, excitedly asked, "Do we get free refills?"

I smiled.

"Yes," I answered. "The refills are most definitely free."

Berta Greenwald Ledecky Undergraduate Fellow Cherone Duggan '14 is passionately committed to her main curricular and extracurricular activity: unstructured time.

SPORTS

It's Up—It's *Good!*

Placekicker David Mothander explains how to split the uprights.

The play that shone the brightest spotlight on David Mothander '14 hardly typifies what he does on a football field. Last November, with Harvard leading Yale, 14-7, in the second quarter, the Crimson and their placekicker, Mothander, lined up for a 22-yard field-goal attempt from the Yale 12. Instead, with a perfectly executed fake, holder Colton Chapple '13 flipped the ball to Mothander, who sprinted unopposed into the end zone. Touchdown, Harvard.

Mothander (MOE-*tander*) is very comfortable with the football in his hands: he played quarterback at St. Margaret's Episcopal School in San Juan Capistrano, California. Quarterbacks are often the best all-around athletes on their high-school teams, and many play other positions on college varsities. "I think there were eight high-school quarterbacks in [my Harvard] class alone," he says.

At six feet, three inches, Mothander's a bit taller than most placekickers, and his experience as a goalie in high-school soccer (he also lettered in baseball as a pitcher and shortstop) may have taught him how to put leg into the ball. Goalkeepers take plenty of goal kicks—the object, naturally, being to send the ball as far as possible from the goal and out of the opponents' reach—to hit it "long and high," as Mothander says. Very similar, in other words, to a kickoff.

Those who watch the National Football League get used to seeing placekickers convert 80 percent or more of their field-goal attempts despite hitting balls spotted 40-plus and even 50-plus yards from the goalposts. Placekicking in the college game is a considerably less routine matter, but Mothander has been a solid performer. Last season, he converted six of eight attempts and hit a long one of 42 yards. He also aced 48 of 50 extra points. As a fresh-

Placekicking: A Brief History

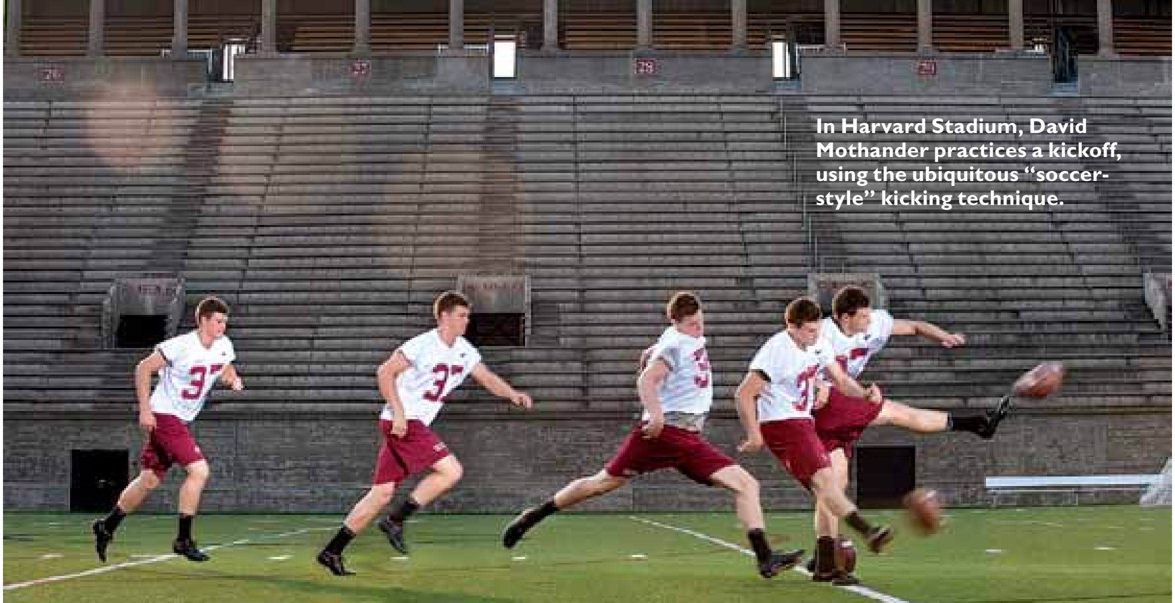
In its early years, American football used a round ball that players would hold in their hands, drop to the ground, and kick on a low bounce. With the advent of the forward pass, the ball took on its current elliptical shape, making it easier to throw—but causing unpredictable bounces. So the drop kick gave way to placekicking, with tees (for kickoffs) and holders (for field goals and extra points).

For many decades, placekickers weren't specialists: position players moonlighted at the task. Gino Cappelletti of the Boston (now New England) Patriots, for example, was a wide receiver, and the legendary Lou "the Toe" Groza of the Cleveland Browns was an offensive tackle. Groza converted 88.5 percent of his attempts in 1953, at a time when most National Football League (NFL) teams missed more than half their field goals.

In the 1960s, accuracy rose markedly with the advent of "soccer-style" kicking, which a Budapest-born Cornell graduate, Pete Gogolak, brought to American football. He kicked for the Buffalo Bills and then the New York Giants (becoming their all-time leading scorer) from 1964 until 1974.

One of Lou Groza's kicking shoes resides in the Smithsonian, but no NFL rule requires that kickers wear a shoe at all. Rich Karlis, who kicked mostly for the Denver Broncos, was the last of the barefoot placekickers; he ended his career with the Vikings and Lions, retiring in 1990.

Photographs by Jim Harrison



In Harvard Stadium, David Mothander practices a kickoff, using the ubiquitous "soccer-style" kicking technique.

man (he arrived at Harvard after a postgraduate year at Phillips Exeter Academy), he made nine of 15 field goals (including one of 43 yards) and 34 of 35 extra points. He also sent 50 kickoffs downfield for an average of 63.1 yards, and achieved comparable results last season.

New NCAA rules will make kickoffs more effective this year, as kicking teams tee up the ball on the 35-yard line instead of the 30, making kicks effectively five yards longer. In addition, touchbacks will now come out to the 25-yard line instead of the 20, offering returners five yards more incentive to forgo a runback. The changes aim to scale down kickoff returns, which rank among the most exciting but also the most dangerous plays in the game, due to high-speed collisions, frequent instances of clipping (blocking from behind), and the semi-chaotic nature of the play itself.

[To receive weekly football reports from "Cleat," sign up at http://harvardmag.com/email]

None of this will affect Mothander's technique, which he began learning before his last year at St. Margaret's and improved at summer kicking camps. For kickoffs, he uses a nine-step approach (five left, four right), beginning nine yards behind the ball and about five yards to the left, to set up "a more natural motion," he says. "You want a consistent approach—be consistent with your plant foot, your strike foot, and hit the ball at the same spot with the same part of your foot." Kickers aim to contact the ball about one-third of the way up from the ground, and just past the bottom of their leg swing's semicircular arc.

On kickoffs, the kicker can start the run-up from anywhere he chooses—theoretically, he could start sprinting at the goal line and hit the ball 35 yards later. Field goals are a different animal: they're essentially a three-man play that includes a long snapper (making a seven-yard snap), a holder, and the kicker. (Harvard's long snapper is Tyler Ott '14; quarterback Chapple has held the ball for Mothander since the kicker's arrival.)

The second crucial difference is that the defense rushes from the line of scrimmage, attempting to block the kick. Field-goal kicks need to rise more steeply than kickoffs, in order to clear the line. Mothander uses a four-step approach (left-right-left-right), starting two steps to the left of the ball, and aims to get the kick off 1.25 to 1.30 seconds after the snap. "It's quick enough to make it difficult to block the kick," he says, "and long enough to have enough time to hit a solid ball. The mindset that you have to have is that every kick is an extra point, because being smooth through the ball is the best way to hit an accurate ball." Crosswinds means factoring in the sideways drift, and against a headwind, he explains, "The longer the kick is, the more the wind will affect it, because the ball slows down more as it approaches the goalposts."

Accuracy involves maximizing the surface area of the foot in contact with the ball, and the duration of contact. The more "foot" a kicker can apply to the pigskin, the more control he'll have over where that ball goes. That's done by kicking the ball "soccer style," the technique that has become nearly universal since the 1960s. Soccer-style kicking, which strikes the ball with the instep, greatly increases accuracy by putting much more foot surface on the ball than the toe-punch technique it supplanted. (The toe-punch does generate power, but is hard to control.)

With field goals and extra points, placekickers often lead their teams in scoring. The job involves pressure, but probably less roughhouse than any other position. On rare occasions, if a returner gets loose for a long runback, the kicker may be the last man able to tackle him. "With any luck," says Mothander, with a grin, "it doesn't come to that."

~CRAIG LAMBERT

Head baseball coach Joe Walsh died suddenly at his Chester, N.H., home early on July 31.

Walsh, 58, served proudly in his self-professed "dream job" for the past 17 seasons, winning five Ivy League championships. He played baseball at Suffolk University, where he assumed his first head-coaching job in the 1980-81 season. He came to Harvard in 1996 as the first full-time, endowed baseball coach, a position funded by former player (and now Harvard Corporaton member) Joseph J. O'Donnell '67, M.B.A. '71.

Walsh's college coaching record is 569-564-3, including the Crimson record 1998 season of 36-12. He is survived by his wife, Sandra, and their four daughters.

HARVARD ATHLETICS

Joe Walsh

First-Generation Challenges

New alumni mentorship program aims to support undergraduates.

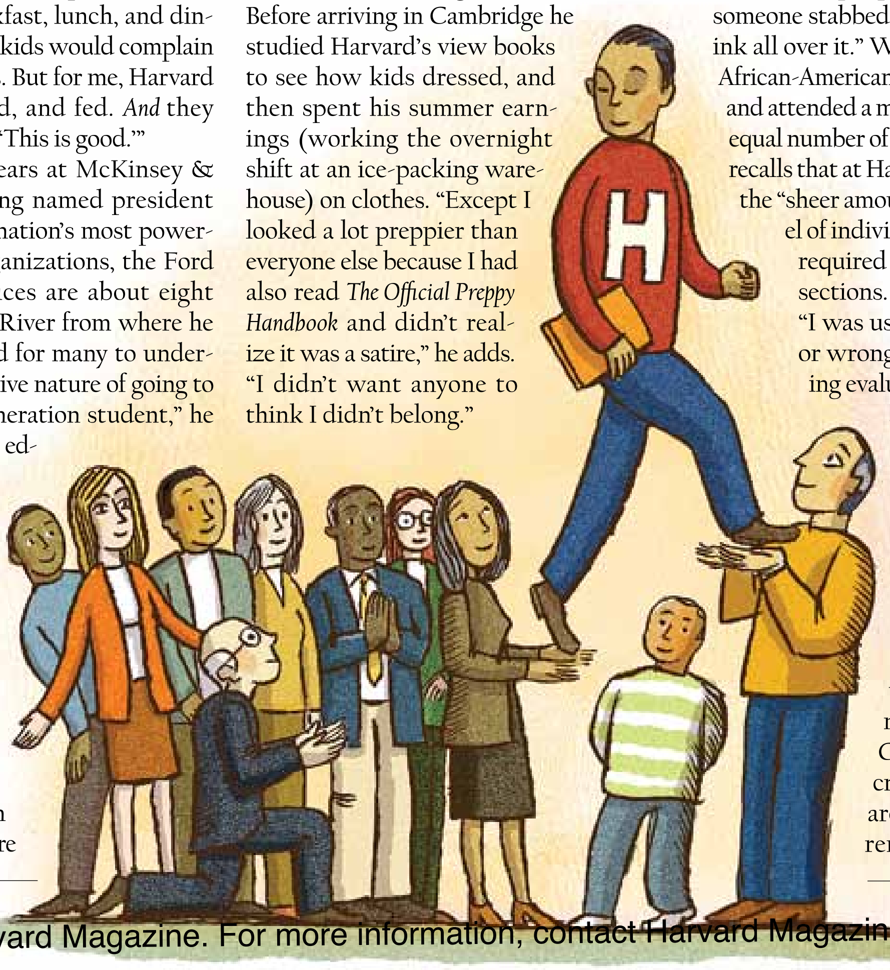
Luis Ubiñas '85, M.B.A. '89, grew up in the South Bronx during the 1970s. His father had died young, so Ubiñas and his four siblings lived with their mother, who made money as a seamstress. At that time, the neighborhood resembled bombed-out Dresden: buildings burned amid piles of rubble and garbage. Poverty and drugs were rampant. Most days brought a simple struggle: to get to and from school safely. "You train yourself to be successful in the moment," Ubiñas reports, "and hope that the accumulation of those successes leads to something good later."

An ambitious, hard worker, Ubiñas landed at Harvard thanks to a series of scholarships and a guidance counselor who, sensing his capacity, told him, "Harvard makes leaders." Ubiñas was simply glad Harvard made meals. "It was the first place I was assured of having breakfast, lunch, and dinner," he notes. "Other kids would complain about different things. But for me, Harvard kept me safe, housed, and fed. *And* they taught me. I thought, 'This is good.'"

Ubiñas spent 18 years at McKinsey & Company before being named president in 2007 of one of the nation's most powerful philanthropic organizations, the Ford Foundation. (Its offices are about eight miles down the East River from where he was raised.) "It's hard for many to understand the transformative nature of going to Harvard as a first-generation student," he asserts. "It doesn't just educate you, it changes the trajectory of your life, your family's life—and maybe even the life of your community."

Not every first-generation student's experience at Harvard is as dramatic. But the sorts of challenges many of them face—ranging from more acute academic and financial pressures to social/cultural isolation to a general disconnection between their lives at Harvard and at home—are complex enough to warrant a new Shared Interest Group (SIG), First Generation Harvard, which aims to increase alumni and institutional support for these undergraduates (defined as those whose parents did not graduate from a four-year college or university).

Founded by Kevin Jennings '85 (a close friend of Ubiñas), the SIG has launched a pilot mentoring program this fall that matches about 20 alumni with first-generation freshmen on a voluntary basis. Jennings was a first-generation student himself. "I fulfilled all the stereotypes," he jokes now, having grown up in rural North Carolina in a trailer, the son of Southern Baptist evangelists. Ashamed of his background then, he hid it. Before arriving in Cambridge he studied Harvard's view books to see how kids dressed, and then spent his summer earnings (working the overnight shift at an ice-packing warehouse) on clothes. "Except I looked a lot preppier than everyone else because I had also read *The Official Preppy Handbook* and didn't realize it was a satire," he adds. "I didn't want anyone to think I didn't belong."



The first six months at Harvard are critical for these students, he says, in terms of orienting them to the culture and establishing communication around support, resources, and opportunities. Last February, Jennings and fellow "first-gens" involved with the new SIG—Paris Woods '06, Ed.M. '08, and Precious E. Eboigbe '07—led a focus group with students from the Harvard Financial Aid Initiative (HFAI) (www.admissions.college.harvard.edu/financial_aid/hfai/index.html), the University's push to make higher education more accessible. Among the findings was a general sense among the undergraduates of feeling terribly underprepared academically. "It comes as a big shock because these kids are by a million miles the academic superstars of their high schools," Jennings explains. "At Harvard they get their first Expos paper back and it looks like someone stabbed them because there's red ink all over it." Woods, who grew up in an African-American neighborhood of St. Louis and attended a magnet high school with an equal number of white and black students, recalls that at Harvard, she had to adjust to the "sheer amount of reading and the level of individual analysis and thought required in papers and discussion sections. In high school," she says, "I was used to there being a right or wrong answer, rather than being evaluated on how well I could articulate an opinion."

Also unfamiliar to many first-gens is the possibility of a closer relationship with teachers who, at home, are generally authority figures "around whom you sit down and shut up," reports Jennings, now CEO of Be The Change, a nonprofit that creates national campaigns around social problems. "I remember going in to see

Stay Connected

"Never relinquish the feeling of your first day at Harvard, or when spring at last comes to Cambridge. Bring that same wonder, excitement, and zest to each new day," the new president of the Harvard Alumni Association (HAA), Carl Muller '73, J.D.-M.B.A. '76, told graduating seniors during his Class Day speech last June. And, by all means, he added, *stay connected*. "Keep up with your friends and classmates, come back for reunions—and every once in a while just check in to see what is going on at the place."

The HAA helps alumni do all of that. The organization supports nearly 200 Harvard clubs and Shared Interest Groups (SIGs) across the globe that are open to the more than 330,000 alumni. It runs the festivities during Commencement and reunion weeks, and helps recruit and interview College applicants, Muller says. Other activities include alumni networking (e.g., Crimson Compass, the HAA's career-networking program) and educational trips with Harvard faculty members. "We're going to be continuing those kinds of broad alumni engagement gatherings in metropolitan areas," says Philip Lovejoy, deputy executive director of the HAA. Also continuing is research into "alumni perceptions of Harvard, how they related to the University, and how they are connecting with each other in general," he adds. Focus groups have already been held in four U.S. cities and interviews conducted with alumni abroad. This summer, the HAA sent a survey to a random sample of up to 50,000 alumni. "We want to identify what we can be doing better," Lovejoy says.

Muller himself will travel to Harvard clubs and meet with alumni throughout his tenure. That includes international excursions, such as the European club leaders' meeting in Vienna in September, and future trips to South America and possibly Asia. "As Harvard becomes increasingly international, it is important to show the flag not only in America, but around the world," he adds. "When Harvard shows up, people feel like they are being noticed and respected."

An attorney in Greenville, South Carolina, Muller first got involved with the HAA as an alumni interviewer in 1973. He has held numerous and varied posts since then, ranging from president of the Harvard Club of South Carolina to class representative to the *HBS Bulletin*. Most recently, he was chair of the HAA nominating committee and vice president of the marketing and engagement committee.

In explaining his devotion to Harvard, Muller quotes David Rockefeller '36, LL.D. '69, who said, "Harvard opened my eyes to the world," when discussing his $100-million gift to the College in 2008. "If Harvard did that for him," Muller notes, "imagine what it did for me, coming from a farm in South Carolina in 1969." He was among six from that state in his class when the "Northeast-centric sensibility" at Harvard was more pronounced than it is today. "When I grew up in the South, that region was very much removed from the rest of nation for political and cultural reasons."

A social-studies concentrator, he went on to practice law in various capacities. "I am in the courtroom and the boardroom," he says. "I have served as defense counsel in capital murder cases and, on the other hand, put together transactions on Wall Street." Much of his trial work involves defending First Amendment freedoms, but he also advises business clients on "how to start, acquire, finance, and eventually cash out of their enterprises." He is currently finishing a two-year term as chairman of the board of South Carolina Legal Services, a firm of more than 50 lawyers that offers free legal services to more than 800,000 indigents. For 25 years, Muller also served on the board of the Phillis Wheatley Association, a nonprofit organization in Greenville that fights poverty through education, athletics, nutrition, and the arts, receiving an award for this service.

Muller and his wife, Allison, have three children: Allidah '05, Amelia '11, and Wiley, a graduate of the University of Tennessee. The couple met on a blind date at Harvard. He was a proctor at Weld Hall. Allison, who had moved to Boston to work at the Museum of Fine Arts, met him there. She was initially skeptical of going out with a Harvard guy but "thought she'd give me a try," he says. "She thought Harvard guys were stuck on themselves, snooty."

Alumni who may want to meet Muller will find him on November 17, the day of the Harvard-Yale game in Cambridge, in a Stadium parking lot with his wife, cooking up barbecue. "We pack up a couple of large coolers of barbecue and bring it with us on the airplane and have it for all the undergraduates from South and North Carolina," Muller says. "We have a grand time!"

JIM HARRISON

Carl Muller

This year, look out for the first-ever "barbecue challenge"—Muller versus Texas alumna Danguole Altman '81, HAA director for clubs and SIGs and co-chair of the HAA clubs and SIGs committee. "We can do it better than they can," Muller says, simply. Alumni are invited to judge the results, and Muller encourages them to stop by: "You can find us there because we'll have the Texas and South Carolina flags flying high." ~N.P.B.

Simon Schama [then Harvard professor of art history and history] because I guess he liked my term paper. But I thought I had done something wrong and that every question he asked was designed to trap me. I answered everything with one word, 'yes' or 'no,' because I was scared to death." For Jennings, there was the added fear that if he did not do well, the College would eliminate his scholarship: "There is a sense among many first-generation students that you are always on probation."

The focus group also showed that many students feel immense pressure around family finances, or expectations/reactions at home. Jennings worked 20 hours a week, often sending money to his mother. "Kids who were the family earners actually feel guilty about being away at school," he reports. Some first-generation students hide the fact they go to Harvard when back in their old neighborhoods, wary of arousing envy or even hostility. "Going to Harvard definitely created a disconnect between me and people back home," says Wood, who also sent money to her family during college. "Whereas classmates could find communities of selective-college grads among their family and friends, I felt like I had been placed on a pedestal as 'the girl who went to Harvard.' It was and still is a tremendous responsibility." This summer she worked as an education pioneer at the Broad Center, a Los Angeles-based organization that recruits, trains, and supports leaders to help transform urban school systems.

While at Harvard, first-gen student Marie Appel '12 completed an independent research study on assessing and addressing the needs of students like her. Her recommendations included forming an alumni support group (akin to the new SIG), increasing accessibility to pre-orientation programs, and raising awareness on campus among students and faculty members about this "invisible minority that does not feel empowered to speak up about who they are."

Growing up in a farming town of 300 people near Syracuse, New York, Appel came into contact with college-bound teenagers only through her extracurricular passion: sailing (which her parents drove her to a country club to learn). "They are the ones who told me about studying for the AP exams and how to prepare for college," she recalls. "When I told my guidance counselor that I wanted to go to Harvard, he asked me what state it was in, then urged me to go into the armed forces."

At Harvard, Appel had three roommates, all legacy students, including one from New York City and another whose father was a governor. One of them asked if she lived in a trailer. She learned of the classification "first-generation student" only when an upperclassman tapped her for a series of interviews on the subject. She remembers "crying during that, realizing for the first

"Fully Part of the Harvard Family"

The new First Generation Harvard Shared Interest Group (SIG) is "the natural outcome of Harvard's very laudable HFAI [Harvard Financial Aid Initiative] program," notes Kevin Jennings '85, who founded the SIG and is launching an alumni-mentoring program for first-generation undergraduates (see page 70). "We cannot just open the door," he explains. "We have to support people once they are here. Many recognize this is an issue and want to make sure these students are fully part of the Harvard family." Among them is dean of admissions and financial aid William R. Fitzsimmons '67, Ed.M. '69, Ed.D. '71. A first-generation student himself, he values engaging alumni on the topic: "Many alums who come from these kinds of backgrounds and even those who did not are very interested and willing to help out and serve as role models and resources."

HFAI is the cornerstone of the University's continuing efforts to make higher education more accessible by expanding scholarships to middle- and low-income students. Announced in early 2004 under former University president Lawrence H. Summers, HFAI first opened to candidates for the class of 2008 (who entered Harvard in the fall of 2004). It currently ensures that students with family household incomes under $65,000 "have no expected parental contribution for their education." Students with family incomes of up to $150,000 "will have an average expected parent contribution of 10 percent or less of their income." According to Fitzsimmons, about 19 percent of Harvard undergraduates come from households with incomes of $65,000 or less. (That group rises to 25 percent at the $80,000-income benchmark.)

Although lower household incomes and first-generation students do not strictly correlate, the new financial policies have generated higher numbers of "first-gens" on campus. Statistics provided by the University's Office of Institutional Research show that an average of 10 percent of those in the classes of 2008 through 2013 are first-generation students. The highest percentage since HFAI was implemented was 13 percent of first-gens for the class of 2012. These numbers have at least doubled from the 5 percent reported for the pre-HFAI class of 2007.

The office is currently studying College student achievement "with a particular focus on identifying any meaningful differences between groups of students (e.g., men and women, first-generation college students, low-income students, etc.)," according to Erin Driver-Linn, director of institutional research and the Harvard Initiative for Learning and Teaching. "This ongoing project examines the relationships between precollege experiences (geography, high school, admissions qualifications, etc.), college experiences (courses taken, concentration, extracurriculars, etc.), and college outcomes (as defined by college grades and honors received)."

Harvard looks at a panoply of factors when considering candidates for admission, Fitzsimmons points out, including income and educational levels of their families. "Correlations between parents' educational levels and their children's various advances in life are quite strong," he says, yet Harvard practices a "holistic admissions approach....In every case you really have to look at everything in that folder, not simply whether or not that person has parents who have not gone to college."

It's a topic close to home. Fitzsimmons grew up on Boston's South Shore, where his family owned a gas station. He tells the story of how the nuns he first approached at his high school refused to write him a recommendation to Harvard because of its radical student body and rich kids.

“The future is completely uncertain for me,” Duggan says. “Nobody I know at home has come to this situation in life before.”

time that that’s why I was different.” She is now following a long-time dream of becoming a teacher through training at Teach For America in Mississippi.

First-gen student Cherone Duggan ’14 (one of only about seven undergraduates from Ireland) was bored in high school. She came to Harvard’s summer program using money she’d earned by working since the age of 12. There she realized that Harvard and the American college system would offer her more of the broad, liberal-arts education she sought, yet it meant leaving her family, including four younger siblings, who jokingly complain she has set the “college bar” way too high for them. The experience has widened overall communication gaps. “It’s hard to explain to them what is going on here when they don’t have the immediate understanding of what classes or degrees mean or how they progress,” she says. “That includes internships and navigating the system of what a college degree would offer—what are the job prospects? How do you go about that process?”

Much of her new practical knowledge has come from her international host family in Boston, whom she has found invaluable. Kevin Mulcahy is an Irish native, and Diane (McPartlin) Mulcahy ’88, M.P.P. ’94, has the College experience to guide Duggan, helping her acclimate not only to America, but also to Harvard’s idiosyncrasies and social structures. The couple also helped her get an internship at a writing organization, which led to her becoming a student proctor at Harvard Summer School.

A social-studies concentrator, Duggan is fully enjoying the breadth of her education by also diving into philosophy as a Mellon Mays fellow, and has plans to go to graduate school. “I see the chance to come here and be educated as the chance to do anything,” she says, “because my parents *didn’t* get to do whatever else they wanted; their jobs were all about being a source of money. I felt if I were to come here and do that [focus only on a preprofessional track] that would be counterproductive.” She feels both the freedom and fear that comes with breaking out. “The future is completely uncertain for me,” she says. “Nobody I know at home has come to this situation in life before.” (For more about Duggan, now a Berta Greenwald Ledecky Undergraduate Fellow at this magazine, see “Summer Reflections” on page 66.)

The College, he says, seeks to orient, educate, and shepherd first-generation students, and is always looking for ways to improve those services. Financial aid counselors, for example, are a consistent resource and avenue of support: “I had two or three issues I needed help with as an undergraduate and they were very helpful in getting me through Harvard smoothly,” he recalls. Harvard’s Advising Programs Office (APO) is a growing resource (the number of advisers for the College has doubled during the last decade). Through the Peer Advising Fellows (PAFs) program, upperclassmen volunteer to be paired with 10 freshmen each, to help the first-years with the transition to Harvard. This year, PAF training will include a section on understanding the specific needs of first-gens. The Student Employment Office has expanded the number of jobs available, including research jobs that can be a rich source of professional mentors. The Bureau of Study Counsel provides academic services, such as tutoring and time-management discussion groups. Fitzsimmons also notes that the number of freshman seminars has risen from about 30 to 130. “These smaller classes would have been good for students like me, who were a bit intimidated to go to office hours because a lot of what we had were large lecture courses,” he says. The seminars give students the chance to get to know faculty on a personal level, “and that is a giant step forward for people who do not know the ropes of a place like this.”

The Student Events Fund, run by the financial-aid office, makes campus happenings more affordable to lower-income students through free or discounted tickets. “They can pick them up without embarrassment,” Fitzsimmons says. “We want to make sure students have a level playing field. I had a brother at Yale and I remember at one point he was walking around for three weeks with a quarter in his pocket.” HFAI has published a 71-page booklet, *Shoestring Strategies for Life @ Harvard* (http://isites.harvard.edu/fs/docs/icb.topic556953.files/ShoestringStrategies.pdf), for students of modest means, while administrators hold meetings and events for them and send out a monthly newsletter that covers opportunities like summer internships, professional training and recruitment events, and other programs.

How else can Harvard best help these students succeed? Fitzsimmons is among those collaborating with the Graduate School of Education’s Pforzheimer professor of teaching and learning Richard J. Light (author of *Making the Most of College*) on a new study of first-generation students at Harvard, Duke, Brown, and Georgetown. About a dozen students from the class of 2015 who experienced successful freshmen years at these institutions will be interviewed, followed by in-depth interviews with a larger study group of first-generation students chosen randomly, along with a control group, according to Light. He also plans to evaluate efforts to support first-generation students at other selective colleges and universities, such as MIT, Dartmouth, Wellesley, and Stanford, to assess what best practices could be applied at Harvard. In addition to this emerging research and that being conducted by the Office of Institutional Research, the experiences of students admitted under HFAI in general are being studied by Paul Barreira, the new director of Harvard University Health Services (see page 64). “First-generation students are an increasing presence even at America’s most selective campuses,” Light concludes. “Everyone has their personal best guess about how to help these students succeed both inside the classroom and outside as well. The point of this project is to do a serious bit of data gathering from the students themselves to learn from their actual experiences.”

As college progresses, Jennings concurs, "these students are disadvantaged in two ways: their understanding of career paths can be limited and they do not have a network of professionals [to call on]. We are hoping these mentors can guide students and make up that gap."

For Luis Ubiñas, whose son is applying to Harvard this year, the goal is much less about changing others' views of the "invisible minority" or increasing external support services. "I would like a narrative to be established in the minds of these students that there is something special about being the first person in your family to go to college, to Harvard, and you should not let it pass," he says. He maintains that the financial aid he received from Harvard and other institutions is a form of trust that he took very seriously and that he has worked harder in light of it.

"There will always be undergraduates with more or less money in their wallets, but there is nothing Harvard can do to control that," he concludes. "And there was value in my having an empty wallet. It reminded me that I had a different purpose, to create a different future for my family and myself. Being there did not mean I had arrived, it meant I had a bridge to go somewhere else."

He wants first-gen students to fully absorb the fact that "the College can accept anyone in the country and it chose you. But then it is your job to make the most of it." ~Nell Porter Brown

HAA Award Winners

Established in 1990, the Harvard Alumni Association Awards recognize outstanding service to the University. This year's awards are to be presented on September 27 during the HAA board of directors' fall meeting.

Teresita Alvarez-Bjelland '76, M.B.A. '79, of Oslo, has held numerous positions in the HAA, including president, vice president of University-wide affairs, treasurer, and elected director. She is a class marshal, and has received both the Hiram S. Hunn and the Radcliffe Distinguished Service Awards.

F. Gorham Brigham '37, M.B.A. '39, of West Newton, Massachusetts, has served as Harvard Business School (HBS) class secretary for more than 73 years and is acting secretary for his College class, which he served as treasurer for six decades. He is a former president of the HBS Club of Boston and earlier this year won the inaugural HBS Volunteer Service Award.

Deborah Gelin '79, M.B.A. '83, of Washington, D.C., was president of the Harvard Club of Washington, D.C., and served as HAA regional director of the Middle Atlantic states. She is also a past recipient of the Hiram S. Hunn Award.

Teresita Alvarez-Bjelland

F. Gorham Brigham

Deborah Gelin

Joseph K. Hurd Jr.

John Paul Kennedy

Michael G. Yamin

Joseph K. Hurd Jr. '60, M.D. '64, of Wellesley, Massachusetts, is a class marshal and a former HAA elected director. He has also been president of the Harvard Medical School alumni association and an appointed director of the alumni council.

John Paul Kennedy '63, of Salt Lake City, has interviewed candidates since 1966 and has been chair of the Utah schools and scholarships committee. He now serves as an HAA director for the cluster of religious identity shared interest groups (SIGs).

Michael G. Yamin '53, LL.B. '58, of New York City, is a 50-year member of the Harvard Club of New York City, having served twice on its board of managers, most recently as vice president. He has been an alumni interviewer since 1958.

Hiram Hunn Awards

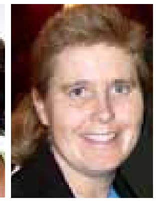
Seven alumni are to receive Hiram S. Hunn Memorial Schools and Scholarships Awards, presented by the Harvard College Office of Admissions and Financial Aid at a ceremony in Cambridge on September 28. The awards' namesake, the late Hiram Hunn '21, recruited prospective undergraduates for more than 55 years.

Stephen W. Baird '74, of Chicago, has been an interviewer since the early 1980s, served as co-chair of the local Harvard schools committee since 2002, and is the former chair of the HAA's national schools and scholarships committee.

Deborah Kaufman Goldfine '85, of Newton, Massachusetts, has interviewed applicants for 22 years and co-chairs the Harvard schools committee in Newton.

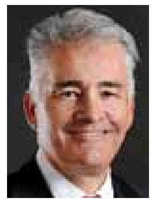
Stephen W. Baird

Deborah Kaufman Goldfine



Stacie J. Kerrigan

Ralph A. Mariani



Daniel A. Medina

Paul E. Thornton

Stephen C. Trivers

Stacie J. Kerrigan '81, of York Beach, Maine, chairs the schools committee in charge of students at Phillips Exeter Academy and conducts interviews in the Southern Maine region.

Ralph A. Mariani '70, of King of Prussia, Pennsylvania, has chaired the Harvard schools committee in Philadelphia for 15 years. He first began interviewing students in 1978.

Daniel A. Medina '79, M.B.A. '83, of San Marino, California, is a longtime interviewer appointed this year as vice president of the Harvard Club of Southern California's schools committee.

Paul E. Thornton '67, of Newark, New Jersey, has interviewed students for more than 40 years and served as chairman of the Harvard Club of New Jersey's schools committee in the 1980s.

Stephen C. Trivers '61, of Kalamazoo, Michigan, is a longtime member of the Harvard Club of West Michigan and began interviewing candidates in 1972.

Toward a Global Strategy for Harvard

Harvard is inherently global. Founded in 1636 by men born an ocean away, Harvard College was intended to enshrine knowledge as a critical dimension of European outreach and exploration. Today the University is building on nearly four centuries of tradition and strength as it embraces a world in which people and ideas move with increasing rapidity and ease. For nearly two years now, we have been involved in a University-wide discussion about how Harvard can most effectively seize the opportunities offered by the changing realities around us, and I wanted to share with you some of the details of our emerging global strategy.

We began by considering our distinctive strengths, chief among them the opportunity for intense study, supported by eminent faculty and outstanding library and museum resources, of a wide representation of geographic areas. The University is home to nearly 80 research centers and academic programs focused on global issues or on specific countries and regions, and offers instruction in more than 70 languages. Enhancing these intellectual strengths is subject- and problem-based engagement that draws on region-based resources. In global health, for instance, we combine expertise across our Schools in fields like medicine, humanities, business, and law with area-specific knowledge to enhance understanding of the cultural contexts in which our efforts are located.

The University's international connections—including some 50,000 alumni in all but five of the world's countries—contribute significantly to our ability to attract the best students, faculty, and staff, and our campus must remain a hub for the world's great thinkers and doers. As we encourage faculty to envision their work and its impact with the broadest perspective possible, we will continue to expand opportunities for students to situate their knowledge and understand their lives in a global context. With the support of a generous gift from David Rockefeller, we hope to ensure that every undergraduate has a significant international experience. At the same time, we are enhancing curricula across the University to underscore the importance of global citizenship. A portion of the Business School's FIELD program, to share just one example, is an international placement for all MBA students at the beginning of their second semester. The understanding gained through immersion is unique, and we must continue to explore ways to make international experiences part of the Harvard experience.

In an era in which knowledge is the world's most valuable resource, we seek to create the largest intellectual footprint with the smallest physical footprint. Rather than selecting one or two locations for the disproportionate attention and investment required to build a campus, we want to try to support the engagements that emerge from the widely distributed interests of dozens of faculty across all our Schools. But we also recognize the wisdom of identifying a few programs in specific countries or regions as University commitments and foci for central support, with the goal of representing the intersections of Harvard's international depth and breadth while uniting and multiplying our collective strengths. Maintaining our core values of academic freedom and autonomy, inclusiveness and opportunity, as we pursue these goals will be as essential abroad as it is at home.

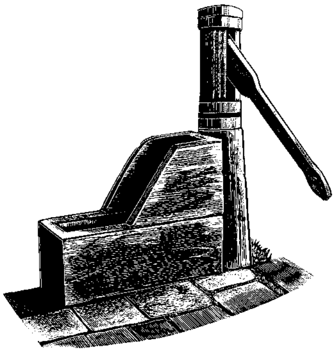
Efforts to expand our reach and sustain collaborations will be strengthened through digital connections. The exploding demand for higher education far exceeds anything that a single institution or even a proliferation of physical campuses could possibly supply. Through edX, our online education partnership with MIT, Harvard will develop a robust digital presence that can work like the ripple of a pebble in a pond, creating ever-expanding opportunities for learning and teaching that have not been available to our predecessors. I was struck by the huge demand for knowledge in public health when I was traveling in India in January. With a new online course on the principles of biostatistics and epidemiology just launched, we have the potential to meet part of that demand.

Harvard will become more intentionally global in the years to come, uniting and leveraging its extraordinary intellectual and programmatic strengths to ensure that our teaching and research have the optimal potential to make a positive difference. What we do next will have an impact not just on the University's future, but on the world's future, a future in which knowledge and education will play an ever more important role.

Sincerely,

Drew Faust

Shepherds, Take Heart



"Your wooden arm you hold outstretched to shake with passers-by."

"I did not learn to read until I was 16, neither could I spell," says William G.R. Marden '46, of Bryan, Texas. "I knew I had a brain with blind spots, dead areas, holes, where there is just zero function."

He was born in New York City in 1922. His mother, a nurse from New Zealand, died when he was 13, and he and his two younger siblings went to live with their grandmother on the North Island of New Zealand on a farm where she raised thoroughbred race horses and 5,000 sheep.

Officials at his elementary school hadn't heard of dyslexia (and neither had he). They concluded that he was mentally retarded and would be of more use tending sheep, he says, than wasting their time and patience trying to pass the school certificate examination.

He spent his days on horseback, riding the hills, looking for ewes needing assistance lambing. He cut the throats of sheep he could not help, skinned them, and threw the still-warm skins on his horse. He did a lot of dreaming. His grandfather, Francis A. Marden, graduated from Harvard in 1863, and his father, Francis S., in 1888. Young Marden dreamed of going to Harvard to learn about science. "The impossibility of it all never really entered my mind. Three cheers for youth," he says now. "Sometimes it does not know its limitations, and I hope it never will."

HM

Visit harvardmag.com/extras to read Marden's memoir in full.

He has written a memoir of his early years, "*La Réalité Surpasse la Fiction*," and judges himself "the luckiest man in the world." He rode his old motorcycle to Wellington, begged passage on a ship to San Francisco, hitchhiked to Cambridge, and presented himself to the head of admissions, Richard M. Gummere. Dean Gummere asked if he had taken any Latin. Marden said he had a good background in animal husbandry, sheep farming, wool classing, butchering, and general agriculture and could ride any horse you could find him. Gummere said Marden had almost a month before the mandatory SAT tests and should study physics and chemistry. He did miserably on the tests. Several weeks later he learned that, due to the war, Harvard would have a special intensified summer school starting the next day. He rushed back to Gummere and asked to enroll in first-year physics. "Let's see what you can do," said the dean.

The head of the physics department himself, Edwin C. Kemble, Ph.D. '17, tutored Marden in algebra and calculus. He worked 18 hours a day. He passed. Gummere let him register as a regular student.

With time off to become a 90-day-wonder officer in the Navy and to serve on a wooden minesweeper in the South Pacific, Marden by 1948 had completed all that he needed to graduate except the language requirement. No language requirement, no degree, pronounced Dean Charles W. Duhig '29, A.M. '32. He assigned Marden a doubled-up French course. A stream of Fs followed. For the first time, no matter what Marden did, he failed. He left Harvard, sans degree, and went to France to learn the language the way a child would, by ear. He worked as a farmhand.

He got a job in a French laboratory doing biological research with horse pituitary glands and earned a Diplôme des Études Superieures from the Sorbonne in 1951, followed by a master of science from Cambridge University in '52. Along the road—perhaps through the intervention of registrar Sargent Kennedy '28, to whom Marden had fired off letters from France—Harvard broke its vow and awarded him a degree. He was a pioneer. It was not until 1963 that the College adopted a stated policy excusing students with pertinent physiological disabilities from the language requirement.

Marden in New Zealand on his way from the farm to Wellington to try to leave for America, 1942

Marden and his wife now spend nine months of the year as stud breeders of Red Brangus cattle and three months sailing and chartering up and down the Caribbean in their 52-foot yacht. They make a point of calling at the islands where French is spoken.

~PRIMUS V

Photograph courtesy of William G.R. Marden

LETTERS (continued from page 8)

nating and very nicely edited class notes and obituaries—and then the terrible last obituary of Wendy Hsi-wen Chang, and the beautifully written and very wise words of Isabel Ruane (The Undergraduate, "Effortless Perfection," page 55) on the perils of super-studenthood and her realization that "My duty to the world isn't to be perfect. It is to take care of myself as best I can so that I can give back to the world the love and care it has given me." I suggest that the obituary and Ruane's piece be in the arrival packet of the super-students of the Class of 2016.

John E. Wills Jr., Ph.D. '67
Pasadena

GETTING THEM YOUNG, PART 1

"Thinking outside the pack" (Open Book, July-August, page 14) brought back memories of my part-time employment with the Student Marketing Institute. I have always had mixed emotions about being the campus representative for Lucky Strike cigarettes. Each month during my junior and senior years, I received dozens of cartons of "Lucky Fives," which I was hired to distribute to my fellow students. I was instructed to stop them in Harvard Square and/or Harvard Yard and offer them a five-pack of cigarettes, with a well-rehearsed spiel about the claim that "Luckies" are "round, firm, and full packed—a perfect cylinder of fine workmanship." I followed up with an offer to "tear and compare." I was given sheet music of the song popularized by Dorothy Collins of *Hit Parade* fame—"Be Happy, Go Lucky Strike"—and asked to provide it to whatever band might be playing at a campus dance. I was also asked to find an attractive coed who would attend the dance in cigarette-girl regalia and distribute Lucky Five packs.

Fortunately, I have never smoked. But I have a guilty conscience about the many packs I distributed to my fellow students.

Edward M. Krinsky '54, M.A.T. '57
Bethpage, N.Y.

Editor's note: Mr. Krinsky's cigarette-selling certificate appears online at http://harvardmag.com/lucky-fives.

LEAR'S HYRAX

Since I've painted birds and animals for years, I was glad to see Edward Lear's work celebrated ("Owl, Pussycat," July-August, page 32). But one picture is misidentified as a hedgehog, when it is clearly recognizable as a very accurate representation of a hyrax. Hedgehogs are distinguished by their short sharp spines. This furry animal looks more like a rodent, but actually is in an order of its own, distantly related to elephants. Lear knew what he was doing: look closely at the picture and you can see that he scrawled "hyrax" at the bottom center of the work.

Most 200-year-old wildlife paintings look awkward to modern eyes, but this is still as fine a painting of a hyrax as we are likely to see. I suppose he painted hedgehogs, too, and wonder if you can give us a look at one.

Peter Salmon, M.A.T. '60
Henryville, Pa.


Hedgehog


Hyrax

Editor's note: Mr. Salmon is correct; we apologize for the error, and to hyraxes and hedgehogs everywhere.

GETTING THEM YOUNG, PART 2

I suppose entrepreneur John West's hot new company, which promotes spectator sports to young children, will, as he expects, attain profitability in 18 months, and will bring joy to "the next generation of sports fans" who are "already spending seven hours a day on screens" ("The Whistle," July-August, page 58). But I hope a healthy percentage of readers reacted to West's marketing plans and your fawning infomercialesque profile as my family did: with a shudder.

Jeff Balch '83
Evanston, Ill.

DOWNSIZING?

The article describing the wrenching process of getting rid of 3,000 books to live a "downsized" life where a couple could "live lighter, suck up less energy; have less stuff to take care of, to clean, to repair and maintain" ("Omnia Mea Mecum Porto," New England Regional Section, July-August, page 20F) notes the subjects eventually "took a few hundred up to their farmhouse in Maine." Quick, copyeditor, how do you spell *clueless?*

Debra Cash, M.Ds.S. '95
Belmont, Mass.

THE PRESIDENT'S PRIORITIES

Ouch! It seems the president of our great University will be selling her time and talents to Staples, the purveyor of yellow pads and office doodads ("Faculty Finance Frustrations," July-August, page 48). Sadly not surprising. Haven't we long seen the shift of culture at Harvard? Only witness the backgrounds of the Overseers and alumni-association directors ("Overseer Oversights?" Letters, July-August, page 5).

John J. Adams '62
New York City

In the July-August issue, there is a striking juxtaposition of Lawrence Lessig's concern re the increasing ownership of our politics by the monied few and their corporations ("Corporations are people too, my friend"), the article on faculty conflicts of interest, and the notice of President Drew Faust's plan to join the corporate board of Staples, adding $300,000 of income to her salary and "other compensation" from Harvard, reported as $875,000. Does she have difficulty living on her income? Most Americans, and I daresay faculty members, would not. Does she have abundant free time to devote to the profit-making corporation? Does managing Harvard and its farflung enterprises, educational and otherwise, consume so little of her time? Does Harvard not buy office supplies, and is there not a conflict of interest?

Franklin Miller '67
Las Vegas

THE WAY TO TRAVEL

It was great seeing Steven Ujifusa's Vita on William Francis Gibbs and the SS *United States* (July-August, page 36). Instead of making a museum out of the ship, as nice as that would be, I would recommend putting her back into transatlantic service so that travelers can continue to enjoy what real travel is like: leaving relaxed, arriving relaxed, and, by having to adjust your watch only an hour a day, not having to suffer through jet lag.

I think this ship could make a major contribution to the world by getting people out of their jumbo jets and helping them understand the quieter graces of living just a bit more slowly.

Dan Adams '67
Fulton County, Pa.

Reform School

Harvard's long-closed Social Museum promoted progressive values.

THE DECADES before and after the turn of the twentieth century have been called the Gilded Age, the Age of Innocence, the Age of Excess, the Progressive Era, and the Age of Reform. "The unregulated rags-to-riches economy brought extraordinary fortune to a few shrewd men like Andrew Carnegie, J.D. Rockefeller, and J.P. Morgan, but to most others—too many others—it brought extraordinary hardship," writes Anthony W. Lee, professor of art history at Mount Holyoke College, in *Instituting Reform: The Social Museum of Harvard University 1903-1931*, just published by Harvard Art Museums (distributed by Yale University Press). "The conspicuous losers were people of color, workers, immigrants, the growing ranks of the unemployed, the hard-up families of the tenements, and the unsuspecting victims and displaced populations of military adventures abroad."

In 1900, Francis Greenwood Peabody wrote, "Behind all the extraordinary achievements of modern civilization, its transformation of business methods, its miracles of scientific discovery, its mighty combination of political forces, there lies at the heart of the present time a burdening sense of mal-adjustment which creates what we call the social question." The Plummer professor of Christian morals, Peabody taught social ethics. He wanted his students to understand the gravity of the pervasive social problems and to strive to find solutions to them. As an aid, he opened in 1907 the Social Museum, in Emerson Hall, with an archive of thousands of photographs devoted to the lives of the other half. Among the 4,500 still extant are the three shown here: of tenements in Chicago, circa 1908; of the bottling department at the H.J. Heinz Company, Pittsburgh, circa 1903; and of a boys' cooking class, 1907, in Boston's South End House. The entire archive is searchable at www.harvardartmuseums.org/socialmuseum.

The Social Museum closed in 1931, but has been reopened in a sense in the richly illustrated *Instituting Reform*, edited by Deborah Martin Kao and Michelle Lamunière, with essays by them and Julie K. Brown, Elspeth H. Brown, and Lee. The crucial contributors are the photographers. "In their inquisitiveness and ubiquity," writes Lee, "photographers became the great teachers in the age of global modernity, or what some might call the Age of Photography." ~C.R.

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Visit harvardmag.com/extras to view additional images from the Social Museum.